TEXTILE WORLD RECORD

JUNE, 1912

Monthly Comment.

The Revision of the Cotton Goods Schedule

The tariff committee of the American Cotton Manufacturers' Association on May 28 submitted to the House Ways and Means Committee a statement on the revision of the cotton goods schedule. The statement is in part as follows:

Generalities, then, are all that can reasonably be expected from the work of the Tariff Board so far in as reliable foreign data and useful comparisons are concerned.

We favor a reasonable revision of the cotton schedule, based upon the figures at which importations are actually being made and can be made as shown by comparative manufacturers' selling prices at home and abroad, as shall be consistent with the raising of revenue and the conservation of our home market.

Again, in England mills of 80,000 to 120,000 spindles are the rule, with all the economies that can be effected in the standardization of a great industry in such large units; and, where wages themselves, because of the industry being confined to one small area, are so standardized that all mills are on practically an equal footing. In America there are many mills of 5,000 to 10,000 spindles, and the average in the whole South will probably not exceed 12,000 to 15,000 spindles; they are scattered all over the territory and there is no agreement among the mills, nor could there reasonably be any, for a uniform wage scale; each is compelled to pay what the opportunities for other employment dictate in its own locality. Freight rates are widely different, taxes, interest and many other items differ in the same proportion.

The Tariff Board's comparisons are naturally enough, in one sense, based upon like conditions in like mills in England and America, yet, we doubt exceedingly that any political party would care to go before the country upon a platform inexorably demanding that the large majority of smaller mills working under disadvantageous circumstances should be compelled to produce under the same conditions as their larger and more favorably situated competitors, or be ruthlessly stamped out of existence. The fact that the larger and more favored mills would and do profit more than the smaller and less favorably situated ones is but obeying the general law of nature in which the stronger, intellectually and otherwise, have an advantage over the weaker; yet, we have hardly reached the point where our weaker element shall be given no opportunity to grow and become strong.

The only reasonable objection that can be advanced against this proposed method of establishing rates is that the American market price may at some time become artificial rather than competitive, because of some form of restraint of trade by monopoly, trusts or otherwise. The Tariff Board, the Ways and Means Committee, or any other responsible governmental body could, however, easily investigate from time to time and ascertain whether such conditions existed; and, if found, could make due allowance therefor. At the present time, it is admitted by everybody that the Cotton Industry is singularly free from restraint of trade, monopoly, trusts or otherwise, and the prices for its product are governed by the keenest kind of competition.

The noteworthy feature of this brief is the condemnation of the difference in cost as a basis for tariff rates.

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Breaking up Large Plantations in the South

The Southern Commercial Congress, of which Senator Fletcher of Florida is president, recently adopted the following resolutions in favor of breaking up large plantations in the South into small holdings owned by white settlers:

Whereas, the ratio of effective citizenship to population in the South is but little over one-third that of the agricultural states of the West, and,

Whereas, the only hope of agricultural up-lift in the South lies in the fundamental solution of this difficulty by the creation of a soil tilling, farm-owning white population, sufficient to render this ineffective population a negligible quantity, and,

Whereas, the large plantation system is an absolute bar to individual small farm ownership,

Therefore be it resolved that this Congress heartily commends to the people and their legislatures serious consideration of this question, and immediate and effective steps to break up large plantation holdings, and to this end we suggest to the Board of Directors the appointment of a permanent committee on this subject.

In accordance with these resolutions Senator Fletcher appointed the following committee:

L. C. Irvine, Mobile, Ala., chairman; Col. Harvie Jordan, Atlanta, Ga.; T. F. Peck, State Commissioner of Agriculture, Nashville, Tenn.; E. J. Watson, Commissioner of Agriculture of South Carolina, Columbia, S. C., and Geo. W. Deen, Waycross, Ga.

While the resolutions are aimed at the large plantations already found in the South the movement will doubtless be directed toward the organization of large holdings, as has been contemplated by various cotton growing corporations. This work is in line with the movement inaugurated some time ago by the Congress to educate the farmers of the South in the intensive cultivation of the soil. Dr. Maurice Egan, United States minister to Denmark, recently made a tour of the South under the auspices of the Congress, and delivered lectures in many cities on the intensive farming methods of the Danes. On his return to Washington, Dr. Egan in an interview said:

Denmark, twenty years ago, was in a poverty-stricken state. The farmers were poor. Today, through intensive farming, Denmark is prosperous and happy. Practically every Danish farmer owns his own land. Bacon, butter and eggs have made the Danes a wealthy people. Products of the farms are marketed through cooperative creameries and stores owned by the farmers themselves. This system has made Danish butter a standard of excellence and high price known all over the world. Not an inch of ground or natural fertilizer is ever wasted in Denmark. If the Southern farmers, who waste so much of their lands, and in many instances wear out their farms, would adopt the Danish methods the South would become the wealthiest section of the globe in a short time.

It will be a long time before the results of this work of the Congress will have a material effect on conditions in the South, but it promises to be successful for two good reasons. It is a sound policy and it has the controlling sentiment of the South back of it.

"Textilose"

A plant has recently been equipped in New England for the manufacture of textile goods from a material known as "textilose." The process is closely guarded and no information regarding it has been made public by the managers of the American plant. It is of German origin and a recent issue of the "Deutsche Wirker-Zeitung" has the following rather indefinite account of it:

The new spinning material, "textilose," discovered by a manufacturer of Adorf, is manufactured from paper and wool waste. It is said to be stronger than jute, but much cheaper. It is suited for the production of sacking, upholstery and curtain materials. A textilose mill has been in operation at Fleissen, near Asch, Bohemia, for some time. Another textile plant is being equipped at Oppeln, Silesia. A number of Austrian jute manufacturers have secured the right to use the textilose process in their mills.

Overcrowding in Textile Manufacturing

A report recently made to the people of Little Falls, N. Y., on the prevalence of tuberculosis in that city, carries a warning that should be heeded in every section of the country. The ravages of the disease had become so serious that some time ago a visiting nurse, Miss M. Helen Schloss, was engaged by the Fortnightly Club of Little Falls to study the situation and report as to causes and remedies. After a careful examination of conditions Miss Schloss recently made the following report:

To the Public of Little Falls:

The tuberculosis problem of Little Falls is tenfold harder to deal with for the reason that the housing conditions and the congestion are almost indescribable. People afflicted with tuberculosis sleep in beds with other members of the family or boarders. They crowd in one room, and the windows are tightly shut. The tubercular patient spits anywhere in the house and in public places, such as mills, hallways, street cars and the streets.

The tubercular patient usually works until the very last stages. In this way he can infect his fellow workers in the mills by using the same drinking cups, and by spitting all over the place. The fact of the matter is that he not only will infect his fellow worker standing alongside of him

but that he is liable to infect anyone who happens to come in his direction, the visitor or anyone else. Germs know no discrimination; they grasp poor and rich alike.

It is perhaps needless to go into detail to describe the tenements of Little Falls. No doubt all people who have eyes to see and noses to smell will see and pretty soon smell conditions. Perhaps some people never see nor smell things until they come forcibly home to them. Not until one of their beloved ones has been stricken with the dreadful disease can some people learn the lesson, and then it is too late. We are now in a strenuous campaign to abolish the white plague, and it is the duty of every intelligent minded man or woman to enter into this systematic campaign and help it along.

LITTLE FALLS, NEW YORK, IN 1878, LOOKING WEST, JUST BEFORE THE PERIOD OF CONGESTION IN MANUFACTURING AND POPULATION.

Now, a very perplexing question arises, namely: Can we abolish the white plague, or can we even check the spread of the disease? Personally, I say no. I am not a pessimist; on the contrary, I am usually overflowing with an abundance of hope —a hope that comes from a knowledge of the work. I know that tuberculosis is preventable, and that it can be checked and in many instances cured.

The situation in Little Falls, however, has made me somewhat pessimistic for the reason that it is almost impossible to cope with the problem with the amount of congestion that prevails. It is impossible to teach precautions, when six people occupy one thousand cubic feet of air—just enough for one person to be comfortable in for a few hours. Six girls sleeping in one room with closed windows, twelve and fifteen people huddled in one house and the tubercular patient amid them, cats and babies are found who are afflicted with the disease. Not that I wish to put the baby in the same category with the cat, but I cite this to show how the helpless and innocent are exposed to the danger; also the ignorant.

There are houses that fumigation or any other amount of disinfection will not help. They are beyond repair. Some doctors have known patients to move into these houses and leave with the disease after a short while, which proves that Little Falls has lung houses, just as they used to have in New York some time ago. There used to be a block on the east side known as the lung block, where a row of houses was so laden with the tubercular germs that people who went in healthy came out with the disease. That block is now used as a playground for children.

The Fortnightly Club, the Health Officer, Dr. Santry, and the board of health are not so pessimistic regarding the situation, and think that we can check the spread of disease; but not until we get rid of some of our lung tenements; not until we enforce the law regulating the amount of air space each individual shall breathe; not until we enforce the anti-spitting rule; not until we have clean workshops and mills, and not until we get the cooperation of the public. All this, of course, can be done if the citizens take hold of the situa-

tion and help along this general cleaning up, and if each person takes it upon himself to do his or her share.

The first thing that our local board of health will do is to enforce the anti-spitting laws. This is greatly needed. There is perhaps no more disgusting sight than to see a man spit all over the street car or any private stairway entrance. Street spitting is also a great nuisance. On a warm day the germ drys up and floats in the air. We inhale everything of that sort. The second thing they wish to accomplish is to abolish lung houses, so that we can stamp out the disease.

It is with the optimistic health officer and the board of health, together with the Fortnightly Club, that my spirits have somewhat returned and given me a gleam of hope that we shall be able to do our work, and I sincerely hope that the citizens will all band together and strengthen my hope and courage so that we can make Little Falls a safe place to live in, so that we may at least say we have made an effort to check the white plague and we have succeeded.

M. Helen Schloss,
Visiting Nurse.

Such are the desperate conditions that have led an experienced tuberculosis nurse to despair of making progress in the fight with the white plague in this little city in the Mohawk Valley. Prevention is better than cure and in their effort to suppress tuberculosis the people of Little Falls are acting on that principle, but the means of prevention are not all of equal efficiency. Clean workshops and mills and the enforcement of the anti-spitting rule are all right as far as they go, but they reach only the surface of the trouble at Little Falls. The destruction of the lung tenements and the enforcement of the law regulating the amount of air space to each person are recommended, but the difficulty is that these recommendations cannot be carried out until there is a radical change in industrial conditions at Little Falls. At the eastern end of the place the Mohawk Valley is but a narrow gorge, less than a thousand feet wide. Just west of this gorge the two ranges of hills recede slightly from each other, and in this narrow space, through which run the Mohawk river, the barge canal, the New York Central and the West Shore railroads, are crowded a population of about twelve thousand, supported chiefly by employment in the mills and workshops. Every available plot of ground is utilized, and dwellings are crowded so close to the rocky bluff on the south side of the river that a short time ago a mass of rock became loosened at the top of the cliff and fell in the night, crashing through the roof of a tenement instantly killing a man sleeping in his bed.

This overcrowding of a narrow defile is the underlying cause of the conditions to which Miss Schloss' report calls attention in so striking a manner. Nature itself has made it impossible to provide the necessary air for the population of the city. Pushing the hills apart at this point being impracticable, the only alternative is to restrict the growth of the city to the sanitary limit set by the existing configuration of the valley. And this remedy is not likely to prove easy of application. The sentiment of the entire population of the city is set in the opposite direction. The building of new mills and the enlargement of the old ones are hailed as benefits; anything that restricts development is considered an evil. It is not many years since the citizens of Little Falls contributed about $35,000 for the purchase of an idle mill and presented it to a manufacturer on the sole condition that he would build an extensive knitting mill on the site. The condition was fulfilled and the result was what is now one of the largest mills in the city. To aggravate the situation it is a common practice to run the mills both day and night, thus making necessary the maximum increase in the working population. The overcrowding of manufacturing plants is not confined to Little Falls. The evil prevails throughout the entire textile industry, owing to the general trend toward gathering the mills into congested centers instead of scattering them throughout the country. The local sentiment at these centers encourages the evil, but the conditions of Little Falls demonstrate beyond question that the general welfare requires that sanitary limits be set to concentration of manufacturing industries.

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German Weights and Measures

Over forty years ago the German government undertook to force the German people to use metric weights and measures exclusively. And that the undertaking is still far

from completion, is shown by the following item from a recent issue of the "Wochenberichte der Leipziger Monatschrift fuer dee Textil-Industrie":

The new weights and measures law for commerce and industry which went into effect on April 1st provides for great changes in previous regulations. Under the new act all public transactions are to be based only on standardized weights, measures and scales. The new law causes special difficulties in the textile trade as it provides that all weights and measures shall be based on the metric system. As the English weights and measures are extensively used in the textile industry, particularly in cotton spinning, the government was asked to make the use of such weights and measures permissive. On December 18, 1911, the Bundesrat granted this petition by adopting the following provision:

"The use of English weights and measures is permitted in the manufacture of textile goods and in the buying and selling of such goods for export." The metric system is compulsory in the textile industry only for the calculation of piece work wages.

We have been told so often the metric system was adopted in Germany in 1870 in a few weeks and without difficulty that this authorization of the use of English weights and Measures in 1912 may seem strange. It is, however, an ordinary occurrence. The history of weights and measures is replete with similar illustrations of the superior power of custom over law. If the German government had not surrendered, the textile manufacturers and merchants would in defiance of the law have used the English weights and measures which they can now use in accordance with the law.

Imports of Wool and Wool Goods

The improvement in the wool goods trade is reflected in the imports of wool for the nine months ending March. The figures covering this period for the past three years are as follows:

1910	1911	1912
	Wool, Class 1	
89,134,176 lbs.	24,735,140 lbs.	38,253,486 lbs.
$21,788,655	$5,720,405	$8,278,403
	Wool, Class 2	
28,144,773 lbs.	9,418,235 lbs.	9,561,288 lbs.
$7,023,280	$2,605,590	$2,413,899
	Wool, Class 3	
101,398,731 lbs.	57,455,423 lbs.	78,271,139 lbs.
$13,544,799	$7,588,541	$10,313,455
	Total	
218,677,680 lbs.	91,608,798 lbs.	126,085,913 lbs.
$42,356,734	$15,914,536	$21,005,757

The rapidity with which this increase in wool imports follows an improvement in the domestic demand for goods shows clearly the inherent strength of the wool market. Stocks at the mill and in dealers' possession are low, and under such conditions a revival of trade is certain to bring about a prompt advance in wool values.

The imports of wool goods for the same nine months do not show a corresponding increase. This is due to the fact that the wool goods imports, being confined to high priced materials, do not represent fairly the wool products in demand. The wool goods imports for the nine months ending March are as follows for the past three years:

1910	value $19,178,024
1911	15,089,204
1912	11,976,205

Army Contracts for Wool Goods

It will be recalled that last year, when the War Department called for bids for woolen cloth after deciding to substitute carded woolen for worsted cloths, the bidders were allowed to construct their fabrics as they thought best so long as the goods conformed to certain broad specifications. The object of this was to enable the Department to obtain the best construction, something that, it was believed, had not been the result when the manufacturers had been confined to specifications that went into the fine details of manufacturing. After deliveries had been made on these first contracts it was announced that the results showed a marked improvement over the old system. Evidently the War Department is not to rest satisfied with the advance thus secured, for the Quartermaster General has recently sent a circular letter to the trade, enclosing a copy of the proposed specifications for olive drab meltons, and asking whether in the opinion of the persons addressed the specifications are sufficiently specific and will admit of the widest possible competition. The letter also stated that the Department would soon be in the market for a large quantity of the goods in question. The proposed specifications were as follows:

SPECIFICATIONS FOR OLIVE DRAB MELTONS

Wool. To be long staple American fleece wool free from kemp of not lower grade than three-

eighths (3/8) blood. The admixture of noils, shoddy, waste, reworked wools, vegetable fibers or other impurities is prohibited. Broken sliver from cards and mules made at the time this yarn is being manufactured, not to be considered as waste.

Color. To be an olive drab mixture as shown by the sealed standard sample. The various colors required to form this mixture to be dyed in the wool. The colors must be fast to perspiration and climatic influences, incident to the military service.

Width. To be not less than fifty-six (56) nor more than fifty-eight (58) inches wide, independent of selvedge.

Weave. To be a four (4) harness, two up and two down.

Finish. To be a Melton, thoroughly clean, free from crocking, well fulled, sheared face and back and well pressed.

Tests. The following are the tests which will be applied in the inspection:

(1) Washing test. Boil for ten minutes in a solution containing 80 grains of Oleine soap (Army issue) to one pint of water.

(2) Laundry test. Boil for ten minutes in a solution containing 10 grains of dry carbonate of soda to one pint of water.

(3) Roof test. Expose to the weather for 30 days.

(4) Perspiration test. Soak for twenty-four (24) hours in lactic acid, specific gravity 1.21 U. S. P.

(5) Urine test. Soak for twenty-four (24) hours in a solution composed of three (3) drams (avoirdupois) of citric acid to two (2) fluid ounces of water.

(6) Dry fiber test. Place in a conditioning oven a known quantity of cloth and subject to heat until no change in weight takes place. To this weight thus found add eleven (11) per cent. for normal regain of moisture.

To correctly judge results, the specimens that have been subjected to the above acid tests, must be washed with Oleine soap (Army issue) in warm water.

In any of these tests no greater change must take place than would be shown under a similar test made at the same time on the sealed standard sample.

Construction. The details of construction in these fabrics (finished) to be not less than the following:

	13-oz.	16-oz.	22-oz.
Warp threads	2850	2990	2880
Filling threads	48	46	52
Warp strength	46	56	65
Filling strength	32	40	62
Weight	13.5	16.5	22.5

In all points not covered by these specifications to be like and equal to the standard sample in all respects.

Note. Samples of wool shall be delivered to the contracting officer with the first delivery of goods and thereafter as may be desired.

In his circular Capt. De Witt, of the Quartermaster General's office asked whether it would be advisable to eliminate the word "fleece," and if so, why. He also asked for an expression of opinion with reference to the lactic acid test, whether the manufacturers are handicapped in obtaining dyestuffs sufficiently fast to meet this test, and what test should be adopted in case the one given was not essential to fast colors. The efforts of the War Department to improve the system under which textile goods are supplied to the government is in every way commendable. It is a gratifying step forward toward increased efficiency, and we suggest that wool manufacturers cooperate with the Department by writing promptly to Capt. J. L. DeWitt, giving such information as may bear on the new specifications. They should do this regardless of whether they have received the circular letter or not, for it is evident that the sole object of the Department is to decide upon the best possible plan for awarding army contracts for wool goods in the future.

MASSACHUSETTS SAVINGS BANK LIFE INSURANCE

By H. W. Kimball, Secretary of the Board of Trustees Insurance Guaranty Fund of Massachusetts.

Speaking of the high cost of living, a man recently said, "If you can tell me something which has gone down in price in the last five years, I'll go right out and buy it." The cost of life insurance for the working people of Massachusetts is much less today than it was five years ago. The insurance departments of the savings banks, established under this plan, are furnishing the various forms of industrial insurance policies to the people of this Commonwealth at a cost about 45 per cent. lower than they could be purchased in 1906. This remarkable reduction in the cost of life insurance has been made possible because savings bank life insurance is an entirely public welfare movement in which all private profits are eliminated and in which the cost of operation is reduced to a minimum.

Today the Commonwealth of Massachusetts, the savings banks, and employers of labor are cooperating to make this insurance a success. Under the law which was passed

in 1907, the Commonwealth furnishes expert advisors to the insurance departments of the savings banks and also provides for the general administration expenses. For these purposes, the Commonwealth today is appropriating $15,000 yearly.

As is well known, the savings banks of Massachusetts are also public welfare institutions and all profits belong to the depositors. Therefore, those banks which have opened insurance departments are carrying on the insurance business for the public good and only charge the insurance departments their proper share of the running expenses of the bank.

Employers of labor have been quick to recognize that in savings bank life insurance there is offered an unexcelled opportunity for their employes to obtain that insurance protection which is so necessary at the lowest possible expense. There are today agencies in more than 160 of the leading manufacturing establishments of Massachusetts and at these agencies applications for policies may be made and the premiums are collected from the policyholders and promptly forwarded to the insurance departments of the savings banks.

Because of this splendid cooperation, after a little more than three years, there are 6,000 policyholders and more than $2,300,000 of insurance in force. Also, because of the safe and conservative manner in which the business has been administered, the banks have been able to declare large dividends. On monthly premium policies completing their first anniversary, a dividend of 8 1/3 per cent. was declared, and on policies completing their fourth anniversary, a dividend of 16 2/3 per cent. has been declared. After the payment of these dividends, the banks were able at the end of these three years to report an accumulated surplus equal to 20.8 per cent. of the aggregate legal policy reserve.

Three savings banks have insurance departments,—the Whitman Savings Bank, Whitman; the People's Savings Bank of Brockton; and the Berkshire County Savings Bank, of Pittsfield. The trustees of the City Savings Bank of Pittsfield have just voted to establish an insurance department. The largest agency is at the United Shoe Machinery Co., Beverly, where there are nearly 500 policyholders. Other strong agencies have been established at the Dennison Manufacturing Co., South Framingham; Waltham Watch Co., Waltham; Geo. E. Keith Co., Brockton; and the J. Stevens Arms & Tool Co., Chicopee Falls.

Among agencies in the textile mills are those at the Lancaster Mills, Clinton, and at the Naumkeag Steam Cotton Co., Salem. Because of the opening of an insurance department in the Berkshire County Savings Bank of Pittsfield, agencies have also been established at the Berkshire Manufacturing Co., Berkshire Woolen & Worsted Co., Airedale Mills, Musgrove Knitting Co., Pontoosuc Woolen Manufacturing Co., and at S. N. & C. Russell Manufacturing Co. in that city.

Under the Massachusetts plan for insurance, not only are residents of Massachusetts enabled to purchase their insurance at less cost, but also they are able to purchase a much better article. The policies issued by the insurance departments of the savings banks provide for cash surrender values after six months, for extended insurance in case the cash surrender value is not taken, and for loan values at the end of one year. Moreover, the full amount of the policy is paid in case of death at any time after the payment of the first premium. By establishing agencies and interesting their employes in savings bank life insurance, manufacturers not only aid their employes in obtaining the best sort of insurance at the lowest possible cost, but also help to develop thrift and foresight, which result in making more efficient workmen.

THE HEATON PATENT LATCH NEEDLE

Attention is called to the fact that the improved latch needle described on page 324 of our May issue is the Heaton patent needle. It is handled solely by the Continental Latch Needle Co., 120 Liberty St., New York, who invite correspondence in regard to it.

Analysis of the Tariff Board Report on Schedule K

By SAMUEL S. DALE.

The report of the Tariff Board on the wool and wool goods schedule should be judged first by the extent to which the Board has succeeded in attaining the professed object of its investigation, namely, the determination of the difference between the foreign and domestic cost of producing the raw materials, and the partly and wholly manufactured products of wool manufacturing.

THE DIFFERENCE IN COST FORMULA

This object has been definitely and repeatedly stated during the last four years, and recently by the President in these words:

> "First, by fixing the rates at figures . . . based on the difference between the cost of production here and the cost of production abroad, ascertained by means which preclude all doubt of the substantial accuracy of the calculation."

In order to show to what extent this object has been attained by the Tariff Board I have made the following list of the principal products affected by schedule K, and annexed a brief statement of the information disclosed by the Tariff Board regarding the difference in the domestic and foreign cost of each: Raw Wool, Wool By-Products, Shoddy, Worsted Tops, Roving, Yarn, Cloths and Dress Goods, Carpets and Rugs, Underwear, Hosiery, Felts and Narrow Fabrics.

RAW WOOL

The method adopted by the Board for calculating the cost of wool is stated on page 313 as follows:

> "We have considered wool as the chief product and the receipts from mutton are offset against costs. When the receipts from mutton are less than the total flock expense, the difference is called the 'net charge against wool.' When, on the other hand, the receipts from mutton are greater than the expense, the difference is the 'net credit to wool.' And this net charge against or net credit to wool, divided by the number of pounds of wool, is the 'net charge against or net credit to a pound of wool.'"

On the preceding page, 312, the Board condemns this method in these words:

> "Another method is to consider wool the chief product and mutton the by-product and to charge the total operating costs to the mutton and credit the net income of the business to the wool. . . . When, however, the receipts from mutton equal the operating costs, the cost of producing a pound of wool, as found by this method, is nothing; and when the receipts from mutton exceed the operating costs it is less than nothing. . . . It is evident that this method also is inadmissible because the cost of producing a pound of wool, thus determined, varies with the relative importance of the receipts from wool and mutton. When wool is the chief source of income and the receipts from mutton are merely incidental and relatively small, this method is approximately correct; but as the receipts from mutton become relatively more important, the degree of error increases, and when mutton is the chief source of income and the receipts from wool are merely incidental, the futility of the method is clearly apparent."

This condemnation of its own method was superfluous. The absurdity of a calculation by which the cost of wool is a positive quantity under some conditions, zero under others, and under others the wool is obtained without cost, bringing a bonus with it, is self-evident. The report contains extensive tables of cost of American wool based on this misleading method of inquiry.

For the foreign branch of the wool inquiry this method of calculation of course could not be carried out in such great detail, but the results are given for Australian wool on page 11 as follows:

> "In New Zealand and on the favorably situated runs of Australia it seems clear that at the present range of values for stock sheep and mutton the receipts from other sources than wool are carrying the total flock expense. So that taking Australasia as a whole it appears that a charge of a very few cents per pound lies against the great clips of that region in the aggregate."

The report itself supplies the proof that the Board has failed completely to determine the difference between the foreign and domestic cost of wool. The Board admits this in these words on page 10:

> "It is not possible to state in exact terms the actual cost of producing a pound of wool considered by itself."

WOOL BY-PRODUCTS

These products include noils and the various wastes that are unavoidably made in converting wool and by-products into finished goods. They are inferior grades of raw material. In calculating the cost of wool goods the value of the by-products is deducted from the cost of the raw material used in order to determine the net cost of the latter. No part of the cost of manufacturing is charged to the production of by-products. For this reason the Tariff Board is right in the following conclusion, page 12:

> "No comparison as to the cost of production of such products can be made."

SHODDY

Wool rags may be properly classed as a wool by-product, and the omission of any reference to their cost is explained on that ground, but shoddy is a manufactured product for which rags are the raw material. The report contains no statement on the cost of manufacturing shoddy.

WORSTED TOPS

In taking up the various wool products in their order of manufacture, worsted tops are the first for which the Tariff Board offers a detailed comparison of cost. A number of important features of the Board's investigations of comparative costs will, therefore, be considered under this head, but it should be borne in mind that the remarks apply not only to tops, but to wool manufactures generally.

The report gives a comparative statement of the domestic and foreign cost of converting wool into tops, but makes no attempt to give the cost of raw material. It is evident, however, that the difference in the total cost of a wool product must be known in order to apply the difference in cost principle in fixing tariff rates. The omission of any important item of cost makes the comparison worthless for that particular purpose. In the case of worsted tops the Board has omitted the item of raw material which constitutes approximately 90 per cent. of the total cost of worsted tops. The reason for such omission is plain. The variations in the cost of raw material, not only for tops, but for other forms of wool manufactures, are so great from grade to grade and from time to time that its determination is impossible. This impossibility in the case of wool fabrics was recognized and frankly stated by the Board, page 628, in these words:

> "The question of raw material was eliminated altogether, since this is such a fluctuating element."

That is true of worsted tops as well as cloths. Turning to the Board's investigation of the conversion cost of tops, attention is called to the fluctuating and uncertain elements involved as outlined on pages 640 and 641 of the report. Admitting these fluctuations and uncertainties does not eliminate them, and they alone would thwart the purpose of the inquiry. But on top of all these factors the Board informs us, page 641, that the mill records disclose "the widest divergencies" in the conversion cost of worsted tops:

> "In attempting to arrive at the cost of tops from a consideration of actual mill records for a given period of time, we have found the widest divergencies due to the difference in output. For a six months' period in one mill the average cost of production for all tops was only 4.28 cents per pound, while for another six months' period in the same mill running upon practically the same quality of tops the actual average was 9.37 cents per pound. In the first period, however, the output was about three and one-half times the output in the second period. In the first case the mill was running overtime and in the second case much of the machinery was idle, while the fixed and overhead charges continued the same."

The Tariff Board attempts to meet this situation by assuming a theoretical production on the basis of a full running time. This, however, is assuming a condition that is never found to prevail throughout the industry, or continuously in any combing plant.

If so much emphasis had not been placed on the difference in cost theory we might profitably stop here and accept the evidence disclosed by worsted tops as conclusive that the theory cannot be applied to the revision of schedule K. As far as tops are concerned we find that an item constituting approximately 90 per cent. of the total cost has been omitted entirely, because it could not be determined, while the items making up the remaining 10 per cent. are subject to "the widest divergencies." The conclusion is unavoidable that the Board has not determined and cannot determine the difference between the domestic and foreign cost of tops.

ROVING

No attempt is made to give the costs of roving separately. This cost is made up of raw material and the various processes up to and including worsted drawing. Raw material, as we have seen, is eliminated entirely from the Board's calculations. The final process, drawing, is considered on pages 1031 to 1034, but, as in the case of woolen yarn, the figures relate to the labor cost only, all the other items of expense being omitted. We have noted the defects in the calculations for tops, the cost of which is included in the cost of roving, so that it is now necessary only to record the unavoidable conclusion that the difference in cost has not been determined for roving.

YARN

The noteworthy feature of the Board's report on yarn costs is the omission of essential details relating to the cost of carded woolen yarn. On pages 1025 and 1026 there are the reports of the labor cost of woolen carding in 26 mills. On pages 1040 and 1041 are reports of the labor cost of woolen spinning in a like number of establishments. Nowhere is there a statement of the cost of the other items, such as raw material and manufacturing expense, which make up much the greater part of the cost of woolen yarn. The report deals in greater detail with the cost of worsted yarn. On page 645 there begins a general survey of the question. On page 646 are statements of cost for four separate weeks in one mill. It is rather puzzling to find the output given as "yarn shipped," but accepting the figures as indicating the yarn spun, we find the conversion cost varying from 9 1/2 cents on August 26, to 26 1/2 cents a pound on August 5, with the yarn size practically the same. No better proof of the impossibility of determining cost for the purpose of applying the difference in cost formula to the revision of tariffs is required. The Board attempts to avoid this difficulty, as in the case of tops, by assuming a full output. Thus on page 646:

> "In view of this difficulty the Tariff Board has adopted a general rule of figuring all costs on the basis of full normal output, as in the case of tops."

This is assuming a condition that never prevails for any considerable time throughout the industry. Moreover, the question arises. How did the Board revise the cost returns received so as to determine the result that would have been actually reached if the mill had been doing something that it was not doing?

On page 650 the report says:

> "Figures of cost were secured in England from various manufacturers on actual samples,

and in the second column in the table below are given the figures which represent the average of these various calculations."

From this it is evident that the Board obtained from "various manufacturers" in England estimates of cost of certain grades of worsted yarn. These estimates were averaged by some unexplained process and the results tabulated on page 650 for the purpose of comparison with the figures obtained from American mills and revised by the Board at Washington. That is the result, or rather lack of result, attained by the Board in investigating the cost of the material, white worsted yarn, which of all the multitudinous products of wool manufacturing offered the least difficulty in such an inquiry.

CLOTHS AND DRESS GOODS

The cost of cloths and dress goods includes the cost of the yarn and the conversion cost of the yarn into the finished product. To include in the cost calculation for cloth the operations which the Board adopted for the preceding processes would concentrate in this calculation all the uncertainties and errors which have been referred to under the head of raw wool, wool by-products, shoddy, worsted tops, roving and yarn. Moreover, such a method was impossible because of the omission of essential items, as in the case of by-products and shoddy. The Tariff Board evidently recognized this dilemma, for a new start was made with yarn treated as a raw material and the cost calculations for the preceding processes eliminated entirely. The report thus explains how this result was accomplished, page 628:

> "An arbitrary price was assumed for different qualities of wool and yarn, this arbitrary price being the actual price so far as it could be accurately determined for a given date."

This method has the merit of boldness and simplicity, although it cannot be claimed that it "precludes all doubts of the substantial accuracy of the calculation." The figures thus adopted by the fiat of the Board as a substitute for the cost of raw material and its conversion into yarn are termed "prices for a given date." This does not change the fact that they are not costs as contemplated in the formula. It makes the matter worse, for it shows that the Board's ideas were so unstable as to shift from production cost to price without hesitation. This confusion of ideas regarding cost and price is so complete that one of the estimates, No. 32, page 672, contains this:

> "This gives a total cost of 86 cents per yard for those making their own yarn, and 95.5 cents per yard where yarn is purchased."

The adoption of the fiat figures of cost for wool and yarn would alone make the results of this part of the inquiry worthless regardless of the accuracy of the subsequent calculations, and for that reason it is perhaps unnecessary to say more on this particular point. Attention is called, however, to the fact that the list of the figures thus adopted by fiat for wool and yarn is omitted from the report. It is to be found on Tariff Board schedules 1128 and 1129. The following grades and prices are given in the list to cover carded woolen yarn made of wool and mixtures of wool, cotton, shoddy and by-products:

12 to 16 cut, 1/4 blood worsted waste and shoddy	$0.55
12 to 20 cut, 1/4 blood and shoddy (colors)	.65
12 to 20 cut, 1/4 blood and noils (white)	.70
12 to 20 cut, 1/4 blood and noils (colors)	.75
12 to 20 cut, straight 1/4 blood (white)	.80
20 to 28 cut, straight 3/8 blood (white)	.85
From 20 to 28 cut add 1c. per cut.	
32 cut, fine white carbonized	.95
40 cut, fine white carbonized	1.10
2-12 to 2-18 cut, 1/4 bld. worsted waste and shoddy	.50
2-18 to 2-20 cut, in grease	.62½
2-18 to 2-20 cut, in colors	.70
2-22 to 2-24 cut, skein dyed in colors	.77½

There are no established standards for such yarns. They are spun from new wool of every grade; also from mixtures containing wool, cotton, shoddy and by-products, in every imaginable proportion, some with the wool, cotton, shoddy, or by-products omitted, and the mixture made up of the whole or a part of the remaining materials. Not only the proportion, but also the cost per pound of each of these materials varies widely from grade to grade and from time to time. As a result the average cost of the mixtures is subject to even greater fluctuations.

Fixed prices or cost figures are equally absurd in the case of worsted yarn and wool. No feature of the Tariff Board's investigation excites greater astonishment than does this substitution of arbitrary prices for actual cost. This extraordinary method has evidently been adopted not only for American costs, but for foreign costs as well. Take, for example, sample No. 26, page 667. This cloth is made of two grades of cotton yarn and one of worsted. The report says, page 667:

> "The average cost of the yarn used was $0.692 per pound; the resulting cost of the stock material in a yard of cloth is $0.55."

The English cost of the yarn is thus stated, page 668:

> "The yarn material for a yard of cloth is taken at a cost of $0.4085."

These figures do not represent cost in any mill either in this country or abroad. They result from some undisclosed system of estimating, based on arbitrary prices for foreign and domestic yarn. Such calculations do not come up to the level of ordinary guesswork.

As was the case when studying the Board's cost figures for worsted tops, the temptation again becomes strong to leave this feature of the report with the conclusion that the case against the difference in cost formula has been proved, but so much emphasis has been placed on this formula that we will go on to the end of the list.

CONVERSION COST

Turning to the inquiry into the cost of converting yarn into cloth, the fact claiming attention first is that the Board's figures do not relate to the actual cost of the cloths, but to estimates of

their cost. This is admitted on page 628 where the report, after stating the impossibility of determining the actual cost, says:

> "The only method available was to start with certain specific cloths and get the most accurate estimates possible from a number of different mills on the cost of making goods of this quality."

The inherent difference between actual cost, as contemplated in the formula, and an estimate of cost is evident. A manufacturer may estimate the cost of a fabric regardless of whether the goods were made in his mill or not. He determines the character of the raw material by the exercise of judgment, and the construction of the fabric by analysis, and with these particulars makes an estimate of cost based on assumed conditions of market price of materials and expense in the mill. This, however, is not the actual cost, which is determined only by the actual manufacture of the goods, and it is the actual cost which is meant in the difference in cost formula. Not only has the Board substituted estimated cost for real cost, but these estimates have been obtained under conditions that make irregularities and errors inevitable.

The report states, page 629, that the agents of the Board "visited the mills with samples and worked out with the proper officials the cost under each separate process." The published results of their labors are found on pages 651 to 690, in the form of estimates of cost of fifty-five samples of American wool goods, and on pages 694 to 704 in the form of estimates of the cost of fourteen samples of foreign fabrics.

Fortunately it is not necessary to rely solely on one's own judgment or on the opinion of others as to the merits of this system of cost estimates. Three years ago, in 1909, the American Association of Woolen and Worsted Manufacturers adopted the same plan and submitted to a large number of manufacturers the specifications for three worsted and two carded woolen fabrics with a request that estimates of the cost of these goods be returned to the Association. As was done by the Tariff Board, uniform prices were assumed by the Association for the wool and yarn. Following is a statement of the lowest, highest, and average estimates:

	Lowest	Highest	Average
Fabric A	$1.50	$2.02	$1.75⅔
Fabric B	1.47½	1.98	1.78
Fabric C	1.06	1.53	1.29
Fabric D	1.10	1.65	1.37
Fabric E	.85	1.02½	.93⅓

Such figures are worthless and it is certain that the estimates of the Tariff Board are no better.

The sole difference between the estimates of the Association and those of the Tariff Board is that the agents of the Board worked out the figures with the mill officials in accordance with a definite system prescribed by the Board. But a cost system cannot be applied successfully in a mill on short notice. It is necessary first to apply a system for a long period, a year or more, in order to determine the cost per unit of production in the various departments of a mill. Not before this is done does it become possible to make a fairly close estimate of the cost of a given fabric when made in that mill under like conditions. An attempt, such as was made by the Tariff Board, to apply suddenly to a large number of unprepared mills a new system of cost estimating is calculated to give results as misleading and erroneous as were those obtained three years ago by the American Association of Woolen and Worsted Manufacturers. This is evident from the details of the Board's estimates. For example, the conversion cost of sample No. 1 is given as 8 cents per yard, and this note of explanation is annexed, page 652:

> "Taking all of the cost secured by the Board, from mills of all sizes, the average conversion cost is 11.1 cents per yard."

This means that some of the estimates must have varied from 8 cents to considerably over 11 cents a yard. No two mills would agree as to the estimated cost, yet the Board adopts one set of figures for each sample. Why was 8 cents selected for the figures given in the report when the average was 11.1 cents? And was this average calculated by a method that gave the mills an equal weight regardless of size? These questions may appear superfluous in view of the fundamental defects already noted in the calculations, but reference is made to them in order to make the analysis as complete as possible. For the same reason a review will be made of various other features of the estimates.

A number of the estimates refer to fabrics made of wool yarn mixed with cotton or silk yarn. An application of the difference in cost formula would make it necessary to determine the cost of the cotton and silk yarn as well as the wool. Nowhere is such cost given. Apparently arbitrary figures have been assumed for the cost of the silk and cotton yarn, as well as for the wool yarn, and an average of the three calculated by some unexplained process. For example, sample No. 24, page 666, is made of a mixture of cotton, silk, and worsted yarn, and the "cost" of the three is given as follows:

> "The average cost of the yarn described is $0.714 per pound, making a total stock cost of $0.571 per yard of finished cloth."

The plan pursued in the Board's estimates of the foreign cost of the various samples is thus explained on page 630:

> "The method adopted in securing foreign costs on American samples was similar to that used in this country. Samples of identical fabrics cut from the same piece were taken to England and to the Continent. These were shown to a number of manufacturers and their estimates on the cost of production secured, but not in the same detail as in American mills, because foreign manufacturers do not keep their costs in any such detail. In England the costings on these samples are given with the authority of a cloth expert, himself a manufacturer, who took the English estimates secured and corrected or verified them from his own experience or from the costs in his own mill."

The woolen and worsted industry in England is organized on a different basis from that generally prevailing in this country. Cost calculations are simpler and probably more accurate in that country that they are here. For these reasons a fair comparison of the costs in the two countries is possible only after careful revision. Such a complicated cost estimate schedule as the one prepared by the Tariff Board would stagger English manufacturers. The above extract from the report makes it plain that they did not understand the Board's system and did not attempt to carry it out. Figures, however, are easily obtained and the agents of the Board obtained them from a few English manufacturers. Evidently these figures bore the marks of unreliability for they were referred to a "cloth expert, himself a manufacturer," who "corrected or verified them from his own experience or the costs in his own (English) mill." It is unnecessary for us to follow this system into France and Germany. Adopted in response to an order to determine the difference in the cost of production "by means which preclude all doubt as to the substantial accuracy of the calculation," it abandons the cost of production entirely, and substitutes estimates based on assumed figures for the greater part of the cost, and for the remainder on methods that are unworthy of serious consideration either at home or abroad. The Tariff Board knew of the defects in estimates of cost as the following passage, page 628, shows:

> "The difficulty here lay in the well-known fact that estimates on the same sample by different manufacturers may vary very widely, and experience in this regard by associations in the trade who have attempted to arrive at some standard cost method showed the necessity for adopting every precaution to make these figures as detailed, accurate, and fair as possible."

But stating a difficulty does not overcome it, and the knowledge on the part of the Board that estimates would not disclose what they were seeking only increases the surprise that such a plan was adopted. No precautions can make estimates conform to actual cost. In the absence of a knowledge of the actual cost there is no way of verifying or correcting the estimates.

CARPETS, RUGS, UNDERWEAR

The report gives no information regarding the cost of these goods, this explanation for the omission being found on page 9:

> "It proved impracticable to carry out at one and the same time an idefinite number of separate cost inquiries and bring them all to conclusion at a given date. For this reason we are not able to include in the present report data as to the cost of underwear and carpets, regarding which our investigations are not sufficiently advanced to make the results practically useful."

HOSIERY, FELTS, NARROW FABRICS

On the cost of these products the Tariff Board makes no report deserving consideration.

We have reached the end of the list of products. Summing up the situation we find that the Tariff Board's inquiry into cost of production has nowhere given results in whose accuracy any confidence can be placed. Some wool products were omitted entirely: carpets, knit goods, felts and narrow fabrics for lack of time; by-products because the task was impossible.

A fundamentally unsound method was adopted for raw wool. Where costs were actually investigated, as in the case of worsted tops and yarn, the fluctuations from time to time and from mill to mill, made self-evident the impossibility of determining the costs for the purpose of fixing tariff rates. For some materials, roving and yarn, for example, the manufacturing expenses other than labor were omitted. Likewise in some cases raw material, subject as it is to constant, extreme, and indeterminate variations in cost, was eliminated bodily from the calculations. In other cases arbitrary figures were assumed to indicate the fluctuating and uncertain cost of raw material. Estimates were substituted for statements of actual cost. Calculations that could be but little better than guesswork were made for the Board by foreign manufacturers. And finally the reports thus collected were "revised" and "edited" at Washington in an attempt to make them harmonize with each other and conform to conditions of production that seldom if ever exist.

The contrast between this result and the President's definition of what was required is grotesque, but the failure to attain the announced purpose of the inquiry does not necessarily carry with it any reflection on the ability, industry or faithfulness of those who did the actual work of investigation. The fact is, they were engaged in an undertaking that reached far beyond the limits of the possible. The difference between the domestic and foreign cost of producing wool and wool goods cannot be determined for the purpose of fixing tariff rates. Criticism, if it is indulged in, should be directed to the failure to recognize the impossibility of the difference in cost formula and direct the inquiry into practical channels. If that had been done the cost of production would not have been ignored, but would have received its proper share of attention in connection with many other factors bearing on the tariff question. The primary mistake was in making the inquiry hinge on the difference in cost formula. That placed on the Board the work of accomplishing the impossible.

FEATURES OF VALUE

Although the chief purpose of the investigation resulted in failure, as was inevitable, the four volumes of the report contain a considerable body of useful information. In this may be included many of the conclusions regarding the existing tariff law and among which are the following:

Wools of heavy shrinkage cannot be profitably imported into the United States, page 381.

Clean wool of the light shrinking sorts (is procured) at a materially lower net rate of duty than the law apparently contemplated, page 381.

Low priced grades of wool cannot be profitably imported, page 391. If admitted under a revised tariff they could be substituted for large quantities of cotton and shoddy that are used at present.

There is no valid reason for the discrimination

that now exists as between the wools of Class I and Class II, page 11.

The duty on sorted wool was made excessive for purposes of exclusion, and that is its effect. Page 49.

The present duty of 33 cents per pound on scoured wool is prohibitive, preventing effectually the importation of clean, low-priced foreign wools of the lower grades that would be exceedingly useful in the manufacture of woolens in this country, and if so used might displace in large measure the cheap substitutes now so frequently employed in that industry, page 11.

The present tariff excludes all noils except a small quantity of high grade. Page 75.

The present tariff on wool waste, rags, and shoddy is prohibitive except on a small quantity of very high grade. Pages 4, 5, 12, 13, 69, 71, 78, 82. Shoddy is not necessarily the cheap undesirable material that many take it to be. Page 69.

Wools of Class III are used in the manufacture of goods other than carpets. Page 413.

The present duty on worsted tops is prohibitory because the compensatory duty is excessive. Pages 107, 189.

The present duties exclude all yarn except very high grades of which but a small quantity is consumed. Pages 116, 190.

The present specific or so-called compensatory duties on manufactures of wool are excessive and result in making the tariff on such goods prohibitory except for a small quantity of high-priced products, the duties being the highest on low-priced goods. Pages 5, 13, 14, 139, 149, 164, 182, 188, 124, 125, 133, 147, 167, 184.

Domestic prices of wool goods are not always increased to the full amount of the duty imposed on competing foreign products. Pages 5, 14.

Prohibitive duties eliminate the possibility of foreign competition and offer a temptation to monopoly and conspiracy to control domestic prices. Page 5.

These are statements of fact, but of well-known facts that have been iterated and reiterated, particularly during the last three and one-half years, and their appearance in the report of the Tariff Board now is but the acceptance of what has been publicly demonstrated and spread upon the records of Congress.

THE SCOURED WEIGHT OF GREASE WOOL

We now come to a consideration of the conclusions reached by the Tariff Board. The first to claim attention is the recommendation that a specific tariff on wool be based on the scoured weight, page 12:

> "That the chief objection to the present rate on the grease pound could be met by levying some form of specific duty based on the clean or scoured content of the wool imported.
>
> "That the necessary machinery for testing at ports of entry could be installed promptly and cheaply and could be maintained efficiently at small expense."

After recommending a specific duty based on the scoured weight of wool as a desirable and entirely practicable substitute for the present specific duty on grease wool of Classes I and II, the Board qualifies its opinion, on page 397, as follows:

> 'Objection is made to a flat rate upon the scoured pound on the ground that it would not be fair to subject wools of varying value to a uniform rate of duty. It must be conceded that there is some reason in this, but in any event it would give access to all fine, heavy fleeces on equal terms with the lighter-conditioned wools, thus meeting one great objection to the existing law."

IS THE SCOURED WEIGHT TARIFF DESIRABLE?

Two questions must be answered in passing upon this scoured weight proposition. Is the plan desirable? Is it practicable? Fortunately the first question can be readily and conclusively answered by applying a specific rate to the very large quantity of scoured wool sold at the London wool auctions. This scoured wool is, as regards variation in price, fairly representative of the wool sold in the greasy condition. Thus by applying a specific duty to the scoured wool an illustration is obtained of how such a duty would operate if imposed on the scoured weight of foreign grease wool imported into the United States. This test of the scoured weight wool duty has necessitated considerable labor in classifying the wool sold at London according to price. In view of the superior facilities possessed by the Board, and the importance of the question involved, it is somewhat surprising that such a test was not made and the results given in the report. In a letter to the Ways and Means Committee on March 15, 1909, I gave a statement of the high, low and average prices of about 80,000,000 pounds of wool sold by auction at the last sales at London, Liverpool, and in Australia. Following are the prices for the scoured wool included in that statement, with a specific duty of 20 cents per scoured pound applied in order to show the effect of the plan recommended by the Tariff Board. Corresponding variations would result regardless of the particular specific rate imposed:

Scoured Wool Sold at London in January and February, 1909

	Price	Duty	Ad val.
Highest price	63 c.	20c.	32%
Lowest price	8 c.	20c.	250%
Average price	26.4c.	20c.	76%

Scoured Wool Sold in Australia, December, 1908

	Price	Duty	Ad val.
Highest price	39 c.	20c.	51%
Lowest price	6½c.	20c.	308%
Average price	24 c.	20c.	83%

Another illustration of how a wool duty based on the scoured weight would operate in practice is shown in the following statement of 2847 bales of West Australian, Adelaide and New Zealand wool sold at the first series of London sales in January, 1910. In this case the number of bales sold at each price is given. The ad valorem equivalent of a specific duty of 20 cents per scoured pound is given for each price, and also for the average price of the 2847 bales:

2847 Bales Scoured Wool from West Australia, Adelaide and New Zealand. Sold at London, First Series, January, 1910

Bales	Price	% ad val. 20c. per lb.
1	10	200
2	13½	148
5	14	143
5	14½	138
6	15	133
3	15½	129
8	16	125
50	17	118
52	18	111
197	19	105
231	20	100
560 bales 100% and above		
215	21	95
140	22	91
112	23	87
59	24	83
192	25	80
1278 bales 80% and above		
117	26	77
235	27	74
93	28	71
123	29	69
127	30	67
1973 bales 66⅔% and above		
98	31	64
95	32	62
43	33	61
45	34	59
31	35	57
46	36	56
45	37	54
99	38	52
36	39	51
20	40	50
2531 bales 50% and above		
174	41	49
65	42	47
51	43	48
17	44	46
8	45	45
1	46	44
2847	average 27.7	72

Following is a summary of the 2847 bales showing the quantity included within given limits of the ad valorem equivalent of the 20-cent rate per scoured pound:

Bales	% ad val. 20c. lb.
560	100 % and above
1278	80 % and above
1973	66⅔% and above
2531	50 % and above
2847	43½% and above

In order to make these illustrations of the scoured weight wool tariff as comprehensive as possible, I have compiled from the wool circular of Staples, Straker & Co., the following statement of the 30,644 bales of scoured wool sold at the fourth series of London auctions in July, 1911.

Scoured Wool Sold at Fourth Series of London Sales, July, 1911

Bales	Price	% ad val. 20c. per lb.
1	6	333
11	6½	308
1	7	286
1	7½	267
11	8	250
9	9	222
5	9½	210
22	10	200
18	10½	190
16	11	182
8	11½	174
66	12	167
22	12½	160
91	13	154
15	13½	148
139	14	143
36	14½	138
228	15	133
85	15½	129
428½	16	125
587½	17	118
801	18	111
1144½	19	105
1172	20	100
4918 bales 100% and above		
1325	21	95
1450	22	91
1166	23	87
1095	24	83
1163	25	80
11,117 bales 80% and above		
1173½	26	77
1034	27	74
1163	28	71
987	29	69
1114	30	67
1188	31	64
1071	32	62
1058	33	61
770	34	59
1128	35	57
1012	36	56
901	37	54
1093	38	52
843	39	51
766	40	50
26,419 bales 50% and above		
944	41	49
896	42	47
932	43	48
522	44	46
427	45	45
30,140 bales 45% and above		
286	46	44
69	47	43
47	48	42
50	49	41
11	50	40
14	52	38
18	56	36
9	61	33
30,644	average 29¾ cents	67

THE DEFECTS OF THE SCOURED BASIS FOR TARIFF RATES

These exhibits tell their own story. They show that a specific duty based on the scoured weight of wool is subject to ad valorem variations fully as great as those now resulting from a specific duty on the grease weight. This is not at all surprising to those familiar with the prices and shrinkages of different grades of wool, although it had escaped the attention of the Tariff Board up to the time of making their report on schedule K. In recommending the scoured weight as a basis for a specific duty on wool they apparently assumed that the scoured yield was the main factor in determining the value of grease wool, ignoring the equally important factor of grade. The value of grease wool depends upon both shrinkage and grade. These two factors may work in conjunction to raise or lower the price per pound, as when a low grade wool of heavy shrinkage results in a low price in the grease, and when a high grade wool of light shrinkage makes a high price in the grease; or they may work in opposition to each other, as when low grade is combined with a light shrinkage and when a high grade is combined with a heavy shrinkage. In each of the last two cases one factor tends to increase the grease price, while the other tends to depress it. These factors of shrinkage and grade are found in such endless proportions, sometimes working together to determine the grease price, at other times in opposition, that a specific duty per scoured pound is subject to ad valorem variations practically as great as in the case of a specific duty per grease pound.

Illustrations of these conditions, which the Board has overlooked, are found in the report itself. On pages 387 to 391 is a statement of the yield, scoured cost and ad valorem equivalent of the Dingley duty of 11 cents a pound on various lots of wool imported by an American worsted mill. We will take for comparison the 30 bales of Australian merino bought on March 8, 1909, and the 50 bales of South American crossbred bought on December 22, 1906. The Payne (Dingley) duty on the grease weight and a specific duty of 20 cents a pound on the scoured weight of these two lots are as follows:

	Aust.	S. Am.
Grease cost	26.15	26.13
Dingley duty	42 %	42 %
Shrink	49.12%	34 %
Scoured cost	51.39	39.6
20c. per scd. lb.	38.9 %	50.5 %

Here are two lots of wool costing the same per grease pound and on which the ad valorem equivalent of the Payne duty is the same. But as a result of the varying shrinkage the costs per scoured pound are 51.39 cents and 39.6 cents respectively, and the ad valorem equivalents of a 20-cent rate per scoured pound are 38.9 per cent. for one lot and 50 1/2 per cent. for the other.

For another illustration take the 105 bales of Australian merino bought on November 25, 1907, and the 100 bales of South American crossbred bought on June 20, 1908. The results from these two lots are as follows:

	Aust.	S. Am.
Grease cost	26.60	15.28
Dingley duty	41.3 %	71.8 %
Shrink	53 %	33 %
Scoured cost	56.60	22.82
20c. per scd. lb.	35.3 %	89.8 %

In the case of these two lots the specific duty per grease pound varies from 41 per cent. ad valorem on the first lot to 72 per cent. on the second, but great as this variation is, the 20-cent rate per scoured pound varies even more, from 35 per cent. on one lot to 90 per cent. on the other. The 20-cent rate per scoured pound has decreased the ad valorem duty on the fine wool 6 per cent., and increased it on the coarse wool 18 per cent.

This feature of the wool tariff is so important that I have calculated the ad valorem equivalents of the 20-cent rate per scoured pound for the lots in this statement that were bought in 1907 and 1908. The results follow, compared with the ad valorem equivalents of the 11-cent rate per grease pound:

AUSTRALIAN MERINOS

Date	Shrinkage	ad val. 11c. grs. lb.	ad val. 20c. scd. lb.
1907			
Jan. 24	47.2	38.2	36.6
Jan. 24	48.9	39.8	37.2
Jan. 24	45.0	35.1	35.0
Jan. 29	49.8	39.5	36.0
Jan. 31	48.5	39.8	37.2
Jan. 31	48.5	38.4	35.9
Jan. 31	48.5	38.4	35.9
Jan. 31	48.5	39.8	37.2
Jan. 31	49.8	40.1	36.6
Jan. 31	49.5	39.3	36.0
Feb. 1	47.6	44.5	42.3
Feb. 8	47.7	41.8	39.8
Mch. 10	50.6	43.3	39.0
Oct. 4	50.0	40.2	36.5
Nov. 25	53.0	41.3	35.3
Nov. 25	52.5	43.0	37.1
Nov. 18	49.0	41.9	38.8
Nov. 19	46.0	36.0	35.3
Nov. 19	44.4	32.9	33.2
Nov. 25	47.0	36.9	35.5
Nov. 25	47.0	35.0	33.7
Nov. 23	46.3	34.4	33.6
Nov. 16	48.2	36.2	34.0
Nov. 23	47.3	37.2	35.6
Dec. 30	48.0	35.9	33.9
Dec. 30	48.0	37.9	35.8
Dec. 6	46.5	39.2	38.1
Dec. 10	47.5	41.0	39.1
1908			
Jan. 6	47.5	37.4	35.6
Jan. 6	46.5	34.6	33.6
Jan. 25	47.9	37.1	35.1
Jan. 31	46.0	40.2	39.5
Jan. 31	49.0	43.6	40.4
Jan. 11	47.5	39.5	37.7
Jan. 31	48.8	43.3	40.3
Jan. 11	47.5	37.4	35.5
Jan. 20	48.5	40.6	37.9
Jan. 20	49.0	38.9	36.0
Jan. 25	47.5	37.4	35.5
Oct. 9	49.8	43.7	39.9
Dec. 11	50.0	44.0	40.0

Nov. 23	47.0	50.5	39.0
Nov. 23	48.0	41.6	39.3
Nov. 23	47.1	40.6	39.0
Nov. 21	50.6	44.7	40.1
Nov. 21	50.8	45.0	40.2
Nov. 28	47.5	41.8	39.9
Nov. 28	47.0	39.7	38.2
Nov. 28	47.8	40.5	38.4
Nov. 28	50.1	44.2	40.0
Nov. 28	50.8	45.0	40.2
Nov. 28	49.8	46.6	42.4
Dec. 2	51.0	55.3	40.3
Dec. 21	46.0	41.0	39.5
Dec. 21	50.0	48.9	44.4
Dec. 15	46.8	44.6	43.1
Dec. 15	44.6	38.0	38.3

AUSTRALIAN CROSSBREDS

1907			
Jan. 12	33.2	33.9	41.2
Jan. 12	40.5	37.3	40.3
Jan. 16	41.1	37.8	40.5
Jan. 23	38.0	35.3	39.7
Feb. 8	38.0	35.3	39.7

SOUTH AMERICAN MERINOS

1907			
Mch. 19	51.5	43.3	38.2
Mch. 19	50.5	41.5	37.3
Mch. 16	51.5	43.3	38.2
Mch. 28	53.0	49.7	42.4
Mch. 28	47.0	44.1	42.4

SOUTH AMERICAN CROSSBREDS

1907			
Jan. 7	33.5	41.8	50.5
Mch. 14	42.0	39.5	41.6
Dec. 28	32.5	54.4	66.8
1908			
Jan. 2	33.3	56.7	68.8
Jan. 2	36.0	52.8	61.4
Jan. 13	33.5	56.9	68.8
Apr. 7	33.5	68.3	82.6
Apr. 28	33.5	70.9	85.7
Apr. 28	33.5	75.2	90.9
May 15	33.5	75.2	90.9
June 20	33.0	71.8	87.6
June 27	34.0	72.9	87.4

Here are seventy-nine lots of foreign wool bought in 1907 and 1908 by an American worsted mill. On some of them the 11-cent rate of duty per grease pound gives a higher ad valorem than does the 20-cent rate per scoured pound; on others the 20-cent rate per scoured pound is the higher. This variation is the result of the varying shrinkages. With a shrinkage of 45 per cent. the 11 cents per grease pound and the 20 cents per scoured pound give the same ad valorem rate. On wools shrinking more than 45 per cent. the 11 cents per grease pound gives the higher ad valorem equivalent; on wools shrinking less than 45 per cent. the 20 cents per scoured pound gives the higher ad valorem rate. The 11-cent rate per grease pound on these seventy-nine lots varies from 32.9 per cent. to 75.2 per cent. ad valorem. The 20-cent rate per scoured pound on the same lots varies from 33.2 per cent. to 90.9 per cent. In other words, the application of a specific duty per scoured pound has resulted in a fluctuation of 174 per cent. above the minimum, in place of a fluctuation of 129 per cent. under a duty per grease pound.

As only the lightest shrinking wools are imported into the United States under the present duty, the seventy-nine lots given above fail to disclose the comparative effects of the specific tariffs based on the grease weight and scoured weight of wools of low grade and heavy shrinkage. On such wools the specific duty would be prohibitory regardless of whether it was based on the grease or scoured weight. Take for example, the very large quantity of foreign wool shrinking about 65 per cent. and selling for 8 3/4 cents, giving a scoured cost of 25 cents a pound. The Payne duty of 11 cents per grease pound would be equivalent to 126 per cent. ad valorem, while the 20-cent rate per scoured pound would amount to 80 per cent. ad valorem. Both rates would have the same effect—exclusion. It would help neither the manufacturer nor the ultimate consumer to know that they were deprived of these low-priced but useful materials by a duty of 80 per cent. instead of 120 per cent. The burden of exclusion would be as heavy in one case as in the other. For all practical purposes the 20-cent rate per scoured pound on those low-priced wools would be as high as the 11-cent rate per grease pound.

Such are the practical effects of the scoured weight duty, which the Tariff Board tells us, page 398, "would remedy most of the primary faults of schedule K, "and (page 396) would admit on equal terms wools of light and of heavy shrinkage which our present method fails to do." Such are the practical effects of the scoured weight duty which President Taft states (page 4) "obviates the chief evil of the present system and tends greatly to equalize the duty." The President and the Tariff Board are wrong in their conclusions. The facts are the reverse of what they state. Instead of decreasing the diversity resulting from the present duty per grease pound, a specific duty on the scoured pound would increase it. A specific duty per scoured pound would bear heaviest on low-priced wools, which would be wholly excluded, whereas now under a specific duty per grease pound a small quantity of low-priced light shrinking wools is imported. Bad as a specific tariff based on the grease weight of wool is, a specific tariff based on the scoured weight would be worse.

IS THE SCOURED WEIGHT TARIFF PRACTICABLE?

Having found that a tariff based on the scoured weight of wool is even more objectionable than the present tariff based on the grease weight, it is not worth while to devote much time to a discussion of the practicability of the scoured weight basis. It claims some attention, however, because the President and the Tariff Board have laid special emphasis on the practicability of that system. Thus on page 397 the Board says:

> "The Tariff Board has carefully investigated this matter and, with the aid of the Bureau of Standards, has reached the conclusion that it is not only possible but it is relatively a simple matter to test wool by sample at the time of importation. It is also ascertained that the ma-

chinery required for scouring and conditioning wool in small lots is inexpensive and could be promptly installed, and the cost of operation would be light. If Congress should deem it wise to adopt this method of collecting duties upon raw wool, it would seem that the details necessary for its prompt, efficient, and economical administration may safely be left to the proper administrative officers of the Government."

The President accepts this conclusion in these words, page 4:

"The Board reports that this method is feasible in practice and could be administered without great expense."

This statement of the Board is ambiguous. Of course it "is a simple matter to test wool by sample at the time of importation," but will the results of the test show the average shrinkage of the entire lot in each case? Like Glendower, the Tariff Board and Bureau of Standards can of course call spirits from the vasty deep. So can I or any other man, but will they come when we call? That is the question. To aid in reaching a conclusion as to whether the testing of imported grease wool to determine its shrinkage is feasible, let us consider some of the conditions under which it must be carried out.

DRAWING SAMPLES FOR THE TESTS

The first difficulty to arise in testing the shrinkage of a lot of wool is the drawing of a sample to represent the entire lot. Wool as it comes from the sheep carries grease, dirt, dung and other impurities which are removed by the scouring process. This shrinkage in scouring varies widely not only in different fleeces, but in different parts of the same fleece. The grease wool, usually in separate fleeces, is packed in bales each weighing 180 to 1000 pounds, and a cargo is made up of different lots varying from 1 bale to 200 bales or more in size. Take a lot of 100 bales. If a manufacturer wanted to test the shrinkage of such a lot before buying he would buy and scour several, say 2 to 5, bales selected as fair samples. Testing on such a scale is out of the question in the case of the government. In a year like 1909 it would mean scouring from 3,500,000 to 9,000,000 pounds of wool. Not only is that impracticable, but it would mean a depreciation of 8 to 10 cents a pound in the market value of the wool so scoured, say a loss of $350,000 to $900,000. On the other hand if a small sample, say, 50 pounds, is tested the problem is how to draw fifty pounds from thirty thousand pounds more or less so as to have the small quantity represent the entire lot. My belief is that it is impossible, and that the small sample, even if drawn by an experienced, careful and thoroughly honest man, would represent the large lot only by a rare chance.

LARGE NUMBER OF TESTS

It would be necessary to make a separate test of each lot. The average size of the lots sold at London is about ten bales. At that rate it would be necessary in a year like 1909 for the United States government to make approximately 50,000 scouring tests of 50,000 lots of grease wool, or 167 tests per day. The size of this undertaking depends on the size of the test samples, and on that point the Board says nothing.

VARIATIONS IN RESULTS OF TESTS

Scouring tests vary frequently from 2 to 5 per cent. or more. The conditioning process, which the Tariff Board recommends, offers no guarantee against such variation. Conditioning will guard against such variations due to the presence of moisture, but will not guard against the variations due to imperfect scouring.

DELAYS

The testing of wool for shrinkage takes time. Add to this the accumulation of tests in a crowded season and the certainty of disputes involving retesting, the question of delay at the port of entry becomes serious for customs officers as well as for importers and manufacturers. The importer will not know what his wool is to cost him until it has been tested by the government. This introduces an additional cause of uncertainty in a business already noted for its uncertain features.

DISPUTES

The difficulties and impossibilities involved in the testing of grease wool in order to assess a duty on the scoured contents make it clear that every test will offer an excellent opportunity for a dispute between the government and the importer as to the proper duty to be collected. This gives an added significance to the making of 50,000 tests a year.

ERROR AND FRAUD

Under the conditions that surround a scoured weight tariff on wool, serious errors are certain to occur. In addition there is the opportunity for fraud with but slight chance of detection and conviction. Fraud would be easy in drawing the samples and in handling the test lots. Concealment of guilt would be equally easy. The opportunities for defrauding the government would be far greater with the scoured weight tariff on wool than by undervaluation with an ad valorem duty, and the work of detection and conviction would be practically impossible.

RECOMMENDED IN DISREGARD OF EXPERIENCE

The Tariff Board evades the practical difficulties involved in a specific tariff based on the scoured weight of wool by stating, page 397, that "it would seem that the details necessary for its prompt, efficient, and economical administration may be safely left to the proper administrative officers of the Government." Prominence is given in the report to the endorsement of the practicability of such a tariff by the Bureau of Standards. But what the report fails to state is that, as I am informed on the highest authority, this scoured weight tariff has been recommended by the Tariff Board in total disregard of the judgment of an administrative officer in the customs service who has had years of practical experience in the handling of wool, both as a dealer and as an official in the government service. And the judgment of this official is in accord with that of all of the many experienced wool dealers with whom I have discussed this question. There is no escape from the conclusion that the proper administration of a tariff based on the scoured weight of grease wool is utterly impracticable.

(To be continued.)

MODERN METHODS OF MERCHANDISING

By S. R. Latshaw, Manager Textile Deptment of the Curtis Publishing Company.

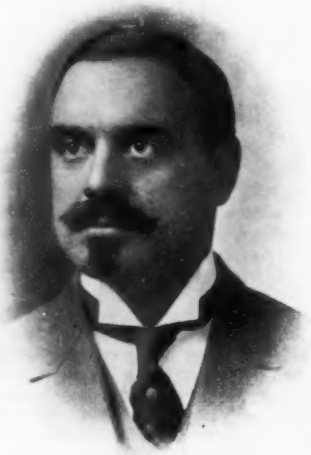
An Address delivered at the Convention of Hosiery and Underwear Manufacturers.

For more than five years I have carefully watched the development and change of selling methods in your great industry. When I first came to these meetings there was some interest and much derision for the newly risen guaranteed hosiery campaigns. The next year there was more interest and less amusement, and so on until today the interest clearly prediminates. I am not especially concerned in discussing here any single phase of the more modern selling methods, but rather in the consideration of general underlying conditions that seem to point to a course which will bring more profit to you in the future.

You remember some of the first automobiles we saw years ago, traveling uncertainly about, perched on bicycle wheels, emitting clouds of steam and often raising from some passerby the cry, "Get a horse." Little did any of us think then of the ten-ton truck and the seventy-miles-an-hour touring car of today. You may question the logic of a comparison between a machine and a method, but I can confidently say that in 1917 we will be equally surprised by the changes which five years will have made in the selling of knit goods.

Changes now going on in other branches of the textile industry, both in manufacturing and selling, demand your attention and consideration as effecting the future of your own concerns. An important change has taken place in the jobbing field. Within the last decade the great department stores have so strongly entrenched themselves in their right to buy from "first hands" that the jobbers have generally relinquished their proprietary claims, and have seen the mills sell direct to our leading fifteen hundred stores.

This "selling direct" to dealers by the mills has now even progressed beyond the leading retailers and frequently extends to the remote outposts and "tank towns." This is shown notably in the knit goods field; many New York State and Western manufacturers are sending salesmen to every town where there are dealers worthy of notice. The jobbers are, of course, trying to adjust themselves to these altered selling methods. The two leaders in the East and West are proceeding in opposite directions. In the East the H. B. Claflin Company interests are buying the control of many important retail dealers, thus gracefully covering a retreat from their former position as exclusively middlemen. Claflin not only "sells the trade"—he is the trade. Marshall Field, on the other hand, while continuing the most notable western retail establishment is now



S. R. LATSHAW.

buying and leasing mills. From the unstable ground of the jobber Marshall Field & Company are becoming distributing manufacturers. In making this move they have followed the lead of Lord & Taylor and Brown-Durrell, who have both, as you know, made great successes in the fine knit goods field. The real competition in the future will undergo a manifest change, due to these improved selling methods. There is little likelihood of any phenomenal improvements in manufacture. But the selling of today is archaic. It must be brought down to date.

While it is true that there are more brands of hosiery advertised today than any other one textile product, and while you men de-

serve great credit for your quicker perception of future needs, it is nevertheless astonishing that there is so comparatively little hosiery sold under the advertised mill brand.

In 1909 the aggregate production of hosiery amounted to more than two hundred million. Of this enormous total, less than twenty million, 10 per cent., bore the name of a national advertiser. And yet, of all textiles, a pair of hose is obviously best suited to modern selling methods. For instance, what are the two factors that contribute most to the advisability of any commodity? First, ease of identification by the consumer as well as by the trade. Second, widespread and continuing demand. As for identification, the identity of two stockings is rarely changed from the time they leave the maker's hands until they are put on the consumer's feet. It is easy and inexpensive to apply a hosiery or underwear trade-mark, and the package or box allows great opportunity for further identification. You gentlemen do not face the puzzling and vexatious problem of the converter, the cutter-up, the manufacturing clothier, and the other inevitable middlemen who alter and change the very nature of the products of the woolen, cotton and silk manufacturers as they pass through their hands. As for demand—well, everybody wears them. They are constantly being worn out (consumed) and as constantly being replaced. They are sold in fourteen hundred department stores, twenty-eight thousand dry goods stores, eighty-three hundred men's furnishing stores and 148,000 general stores—a total of one hundred and eighty-five thousand outlets in this country. What class of goods could be expected to respond more vigorously to the stimulus of scientific selling?

It is probable that the very openness, directness and simplicity of the manufacture of knit goods accounts for the prevailing simplicity in selling methods today. It is comparatively easy to engage in the making of knit goods—a little capital, a loft in Kensington, a boss knitter, some machines on easy terms—and you have another manufacturer. This manufacturer may be unsuccessful. He may have little knowledge of costs and may follow methods which land him in the bankruptcy courts, but in doing so, while he is going his pace, you have just one more factor in the demoralization of your market.

You can, of course, attain a certain degree of manufacturing superiority. You can conceivably buy your raw material a bit more shrewdly, but, when your line can be so readily duplicated and your machines, your help and your raw materials so easily secured by a competitor, your real advantage must lie almost wholly in the thoroughness and strength of the belief of the public in the intrinsic quality of your goods, which will give rise to constant and unassailable demand.

It would seem, then, that your manufacturers would cling tenaciously to a trade-mark representing good will, because that trade-mark is readily the only permanent inalienable asset you can have. To sit calmly in a barren office and allow one's self and one's mill to drift is the shame of many a mill man. Men so old as to acknowledge their inactivity and their dread of any change, manage properties with a single eye to the immediate future and its immediate dividends. The line of least resistance—providing it is lucrative—whether that means selling to a broker, to a catalogue house or to a syndicate buyer, appeals to the sort of mill men who are neither practical manufacturers nor practical sales executives. If you make goods on contract for this man today, for that man tomorrow—your mill, your future, your profits depend entirely and absolutely on one advantage—that of superior manufacturing ability.

Your goods, unless they bear your brand and your trade-mark are not your goods after they are sold to the store—unless the merits of your line are known to be the merits of your mills—you can't be certain to continue the profit due you. You may make goods for Perlmutter & Potash as long as they can't beat your price. When they can—how many of your goods are rejected, what control have you on the situation other than your ability to manufacture more

cheaply or your willingness to take less profit?

The means and methods for simple, practical trade-marking have been fully developed. The jobber has, with a few exceptions, been willing to push the sale of mill brand goods, when these goods were of a quality to justify the consumer demand that had been previously created for them. The retail dealers—I have stated that there are more than one hundred and eighty-five thousand who sell hosiery and underwear with the exception of about twenty-five of the leading metropolitan department stores, are glad to carry and sell honest goods bearing a mill identity for which an honest and genuine consumer demand has been created. Even these twenty-five stores may carry many of the different lines under the mill brands—because the demand has been made so insistent. The machinery and methods for creating a consumer demand for quality goods bearing the brand of the manufacturer are basically alike with all great lines of merchandise.

Notwithstanding the elemental similarity in selling methods, there are certain differences in textile conditions which must be reckoned with and arranged for intelligently. The jobbers are fewer in number and far more powerful and important than in other industries. The department stores with their great prestige and following had their birth in the dry goods line. Their individual investments in their own advertising in any great city dwarf in amount the national appropriations of any three textile manufacturers. The importance of these factors make their coercion well nigh impossible and wildly impolitic. No method of clubbing the dealer into line can be used in the textile field. But with changes in all the factors in textile distribution—commission house changes, jobber changes, cutting-up changes, there is only one changeless factor—the ultimate consumer. To his wants and to her wants we all cater; because of him and because of her, competition exists.

All our stores compete for the consumer's trade; so do the Perlmutters and Potashs; so do the mills. Every selling factor studies to please the consumer. The wishes of the consumer are more potent than the commands of an emperor. The consumer wants quality and honesty in the fabrics purchased; the consumer wants to buy intelligently; the consumer believes that the men who make the goods know most about them. If you make honest goods and if you put your name on these goods, and if you help the consumer to discover these two facts—the wish to buy your goods will be expressed so unmistakably that a large percentage of the retail stores will be glad to buy and sell your goods under your trade-mark to the only permanent friend any manufacturer can have—the ultimate consumer.

WOOL PULLING

BY ROBERT DANTZER

Translated from the French by the Editor of the Textile World Record

The skins from which the wool has not yet been removed, taken from sheep that have been slaughtered or died of disease, are received in bales of different weights. The Buenos Aires bale contains about twenty dozen skins and weighs about 1,100 pounds; the Australian bale contains thirteen dozen skins and weighs 650 pounds; the bales from the Cape do not weigh over 330 pounds. Four skins are folded together with the flesh side out and placed in bales bound with wooden hoops. The Australian bale is bound with five hoops; the South American bale with seven. On each bale is marked the gross weight and the number of dozen of skins. The buyer finds it difficult to determine the yield of wool from a lot of skins. The easiest way is to open several bales, selected haphazard from the lot before the sale and to examine the skins taken from the center of these bales. It is in the center of the bales that the smallest and least valuable skins are found. The skins are graded as follows: A, skins from sheep that have been sheared before killing. B, 1/4 wool, 1/3 wool, 1/2 wool, depending on the length of the fiber. C, Full fleece coming from the sheep to be killed when ready to be sheared. The wool is pulled from the skins by two

methods: 1, by a sweating process, 2, by stripping.

THE SWEATING PROCESS

Soaking. This operation is for the purpose of restoring to the skins the natural moisture lost since slaughtering the animals. It softens the skin and removes the salt added to certain skins for the purpose of preventing decay. The skins are soaked in large rectangular tanks about 26 feet long, 10 feet wide and 5 feet deep. These tanks are sunk in the ground and usually made of cement, the water being supplied at the top and run off at the bottom into a drain. When the tank is empty a workman gets into it and arranges the skins in layers. About 44 pounds of water is required for each skin, making about 10,000 pounds of water for 240 skins, the amount usually put in a tank. The skins are soaked for 12 hours in summer, and 48 hours in winter.

Cleaning. The object of this operation is to remove the sand, straw, grass or other impurities from the wool. The cleaning machines are of different types. Fig. 1 shows the best type. The skin is laid with the wool up on the rollers, 1, 2, 3 and 4, which deliver it to the press rollers, 5 and 6. The wooden roller, 5, is corrugated. The upper roller, 6, is made of rubber and the pressure is obtained by springs, as shown. As the skin comes from the press rollers, 5 and 6, it falls on the oblique table, 7, which swings on a hinge at the lower extremity. The rubber band, 8, serves to hold the skin against the cylinder, 9. The latter is provided with steel teeth or with straight steel bands which strike the skin as the roller revolves. The pressure of the skin against the roller can

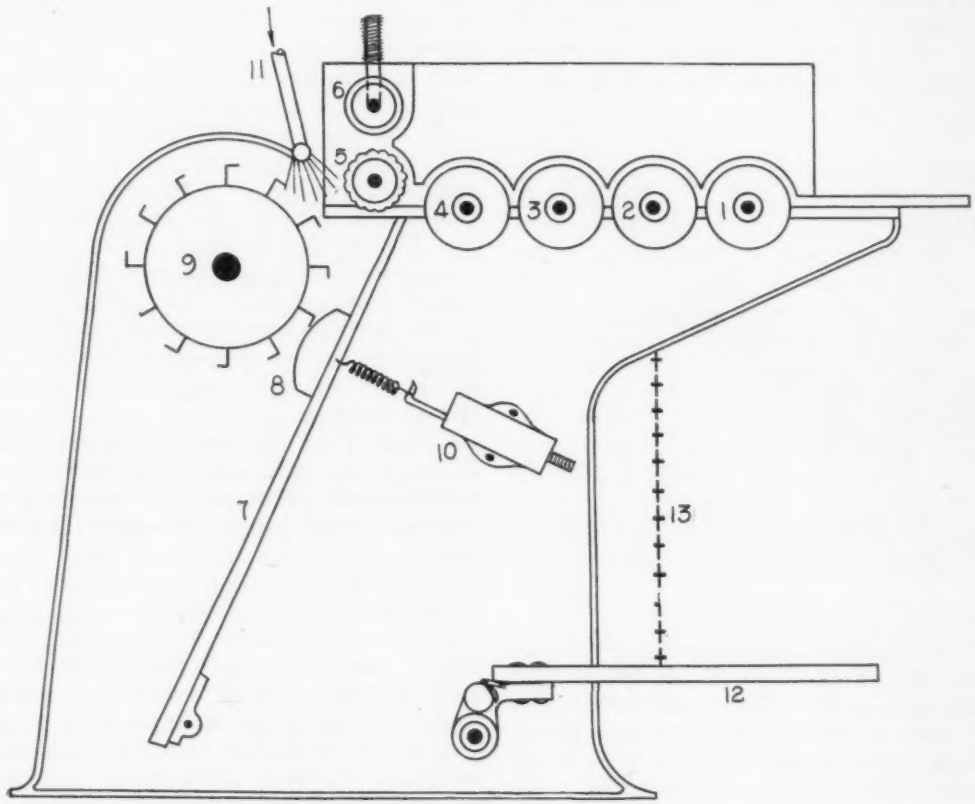


FIG. 1.

be regulated at 10. The action of the cylinder, 9, is reinforced by a spray of water controlled by the pipe, 11, and which removes the impurities. The cleaning operation can be repeated several times on the same skin, as the workman keeps hold of the end of the skin. The pedal, 12, is connected by a chain with a shipper which enables the workman to reverse the machine, causing the rollers, 1 to 6, to revolve in the reverse direction and enabling the skin to be drawn

FIG. 2.

back for another operation. One man can clean about 600 skins in 10 hours. The water, although charged with impurities, can be saved if desired, but it is first passed through a metal sieve in order to save any wool that it may have carried with it. The wool thus collected is carbonized by the sulphuric acid process.

Resoaking. This operation, which is similar to the first soaking, lasts for twenty-four hours and is for the purpose of regulating the moisture. In some plants the second soaking is omitted.

Sweating. The skins, after having been drained, are placed on a truck and carried to the oven. These ovens, which are generally sunk in the ground, have each an area of from 430 to 530 square feet and are 6 feet, 6 inches wide. Hooks, from 2 to 3 inches apart, are fixed on wooden rails about 5 1/2 feet from the ground. The skins are hung on these hooks by the hind legs. The space of 1 foot between the hooks and the ceiling is necessary in order to allow for the storage of gaseous products and to expose all parts of the skin to the same temperature.

A strong odor of ammonia comes from the ovens, as a result undoubtedly of the special bacteria which exert a destructive action on the hair follicles. The care of the oven is the most important part of the operation. Much experience is necessary in order to determine the time at which the skins should be removed. If they are taken from the oven too soon the removal of the wool will be difficult. On the other hand if the skins are left too long in the sweating house putrefaction may set in and the skins lose their value for leather. The duration of the sweating process varies greatly and depends upon the temperature outside. It is longest in winter and shortest during stormy weather.

Classing. As they come from the sweating house the skins are of a greenish shade and very soft. They are first classified according to the length and quality of the wool.

Stripping. The wool is pulled from the skins by hand. For this purpose the skins are laid over a wooden horse, as shown at Fig. 2. The wool is then removed from the skin by means of a two-handled knife, slightly arched and having a saw tooth edge. The workman scrapes the skin with this knife and the wool is thus very easily removed. A number of boxes are placed in front of the stripping horses and the wool is sorted as fast as it is pulled from the skin. The removal of the wool from the legs offers the greatest difficulty and in order not to injure the leather the skins are submitted to another process called:

Liming. The skins after rinsing are immersed in a large tank containing milk of lime which is agitated constantly by a series of reels running in the liquor. This process lasts for eight or ten hours. The lime destroys the hair follicles.

Scraping. This process is similar to strip-

ping. The skin is stripped with a two-handled knife to remove all the fibers that may remain on it. This wool loaded with lime is used in the manufacture of felts. In order to prepare the skins for this operation the feet are cut off in order to obtain a uniform surface. The pieces of skin are used in the manufacture of glue. In most establishments the next process is:

Drying. The skins from which the wool has been removed are hung by the legs either in the open air or in drying chambers where they are exposed to a circulation of hot air. At the end of several hours the skins are classed according to their shape and condition, after which they are offered for sale. The value of the skin in this condition depends upon the sweating process. Skins that have been damaged are used in the manufacture of glue or for parchment. To facilitate the drying process the wool is passed through iron squeeze rolls to remove the surplus water. The upper roller is covered with felt and driven by friction. The wool is then dried in a machine. In some cases the wool is first scoured, being immersed for twelve minutes in a solution of soda and soap. This solution, containing 20 per cent. of soda ash and 1 per cent. of soap, is prepared in iron tanks heated by steam to 120° F. The wool is then taken to a circular washing machine in which the water is supplied tangentially. The wool is delivered from this machine onto a central grating. It is then extracted to remove the surplus water and dried in a machine. It is next sorted according to length, quality and strength of the fiber. Where the wool pullery is near a combing mill the wool is taken direct to the latter establishments because there is a tendency for the wool to become heated and the fiber injured. Some wool pulling establishments tan the skins while others deliver them ready for tanning. In the latter case the skins are scraped on the flesh side in order to remove the grease and other impurities. They are then washed in clear water and dried in a dilute solution of sulphuric acid to precipitate the excess of lime. A second scraping is followed by a scraping of the wool side of the skin which is then ready for tanning.

Stripping. This method is used for French or other European skins, yielding leather of the greatest value, the wool being considered a by-product. The skins are bought by the dozen at the slaughter house while the animals are still alive. Upon their arrival at the pulling establishments the skins are subjected to the following operations:

1. Washing. This washing is in clear water and has for its object to remove the blood, earth and other impurities from the skin.

2. Extracting. This is to remove the surplus water.

3. Soaking. This process lasts for twenty-four hours and is similar to that already described, having for its object to soften the skins. The skins are placed on a horse and the feet and head are cut off.

4. Cleansing. The cleansing of the wool is effected in the manner already described.

5. Soaking. The skins after being cleaned by the preceding process are placed in tanks filled with water. In order to exclude the air the skins are covered with planks on which are placed heavier weights. This second soaking lasts from one to two hours.

6. Preparing. The skins are coated on the flesh side with a solution of sulphate of sodium and lime, or with a solution of sulphate of arsenic. The solution is applied to the skins with a rag fixed to the end of a stick. The skins are hung by the legs in pairs on frames provided for the purpose. At least twenty-four hours must elapse before the skin is ready for pulling. Nevertheless they are often left hanging for five or six days.

7. Pulling. The wool is pulled either by hand, as already described, or by power. In the latter case the Molinier machine is used. It consists of a cylinder armed with helicoidal bars without a cutting edge. The skin held by special clamps is pressed against the cylinder by a rubber-covered roller adjusted by a pedal. Before the wool is pulled it is necessary to remove the preparing solution either by rinsing or wiping.

8. Rinsing. The skins from which the

wool has been pulled are rinsed in large tanks.

9. Liming. The skin is left in a solution of milk of lime for twenty-four hours in order to remove all traces of the wool. The skins are then prepared for tanning by the usual methods. The wool is extracted and then dried. The wool thus obtained is of much less value because it has been affected by the chemicals. The sweating process is usually employed in France and the greater number of the pulling establishments are near Mazamet. The stripping process is employed at Salies-di-Bearn, Villenave-d'Osnon, Choisy-le-Roi and other places.

The sweating process gives a better quality of wool and an inferior grade of leather, the skin being treated in order to save the wool, with the skin itself considered a by-product. When using the second process the object is to preserve the skin for leather, the wool being a by-product.

During 1910 Russia imported raw cotton to the value of $66,994,290, as compared with $49,905,900, of which the United States supplied $26,727,985.

WOOLEN AND WORSTED OVERSEERS

The thirtieth annual meeting of the National Association of Woolen and Worsted Overseers was held on May 18 at Rocky Point, R. I., with an attendance of between three and four hundred members. There were a great many members present who did not register, hence their names do not appear in the list of those present.

The meeting was called to order at 11 o'clock by President Louis M. Allison. The minutes of the last meeting were read by the secretary and accepted. The names of new applicants for membership were read and placed in the hands of the committee to investigate, to be reported on at the next meeting. The committee reported favorably on the names of those given for membership at the last meeting.

MEMBERS AND GUESTS

The nomination of officers for the ensuing year resulted as follows:

President, Richard J. Hill and James Pickford; first vice-president, Joseph T. Dolan; second vice-president, Edgar N. Taft; third vice-president, Thomas M. Smith; secretary, E. Fred Deverell and Walter Pickford; treasurer, Thomas Buchan; secretary of beneficiary dept., Henry G. Morey;

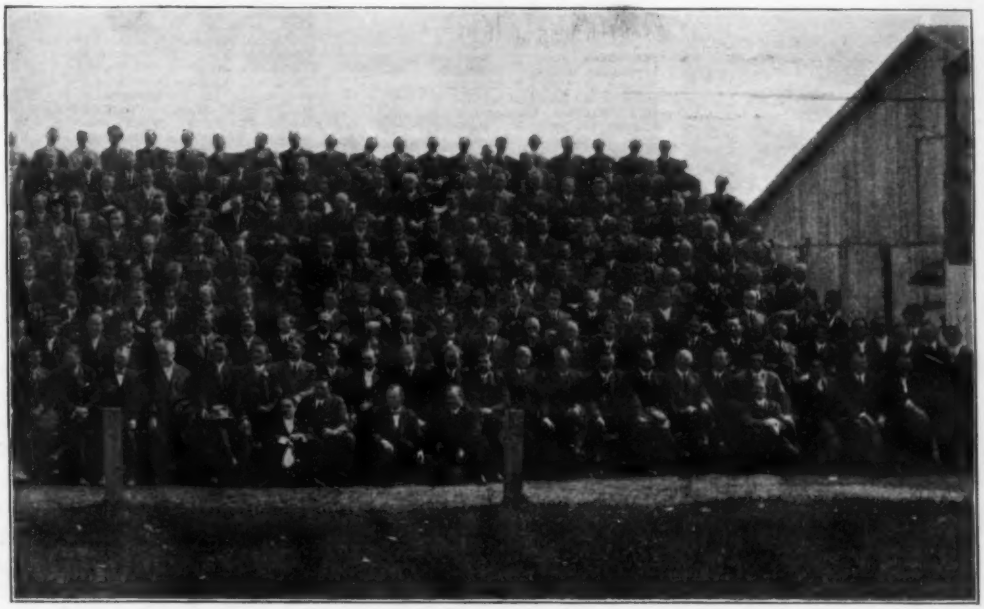
treasurer of beneficiary dept., Thomas Buchan; trustees, C. M. Hurst, Louis Carmack and James Wilson.

A motion was made and seconded that no member should be considered for any office in the association who does not hold a position as overseer or superintendent at the time of the nomination. This motion, according to the constitution, was laid over until the next meeting.

A very interesting letter was read by President Allison on the unrest existing among mill men and he advised that the members of the association would contribute papers to be read on subjects of current interest and that discussion be encouraged at the different meetings. He urged every member to do something to make the meetings interesting and instructive.

A committee of five was appointed to arrange for the banquet to be held in November. A committee of three was appointed by the President to provide copies of the constitution and by-laws for the next manual.

The dinner which was served soon after the meeting was all that could be wished for.



AT THE MEETING OF OVERSEERS.

CONNECTICUT

Thorpe, Fred, Talcottville.
Riley, Albert E., Rockville.
Winslow, J. H., Elmhill.
Ashton, Fred, Putnam.
Barden, Jas., Mystic.
Eyers, William, Central Village.
Bradley, J. E., Talcottville.
Gallagher, F. P., Central Village.
Aubach, Edw. H., Stafford Springs.
Greenhalge, ——, Central Village.
Horton, C. C., Dayville.
Lyons, J. J., Moosup.
Jowett, William, Central Village.
Henault, C. J., Derby.
Kennedy, John, Mystic.
Mcrey, H. G., Danielson.
Mayer, F. W., New Boston.
Hollingworth, Fred, Norwich.
Nettleton, W. H., Central Village.
Linehan, John J., Putnam.
Shepard, E. B., Stafford Springs.
Neff, F. C., Rockville.

MASSACHUSETTS

Whitehead, J. W., Lowell.
Weeks, J. C., East Douglas.
Welch, Martin, Auburn.
Rack, James J., Cherry Valley.
Ranschousen, Fred, North Andover.
Riley, P., Uxbridge.
Rule, J. H., North Billerica.
Remington, A. L., Franklin.
Remoille, Peter, East Douglas.
Slater, A., North Andover.
Schellschaid, Gustave, East Douglas.
Tempest, Mark, Holyoke.
Wishart, George, New Bedford.
Wehinger, J. J., North Adams.
Wyer, Hugh E., Uxbridge.
Pendergast, T., Newton Lower Falls.
Philbrick, C. H., Worcester.
Sullivan, Daniel, Oxford.
Supple, William, Oxford.
Whittemore, F. L., Quinapoxet.
Truesdale, J. E., Jefferson.
Carter, Fred, Clinton.
Carter, Joseph, Uxbridge.
Harrington, Robert, Dalton.
Emsley, Howard A., Farnumsville.
Entwistle, F. J., Monson.
Eyers, Benj., North Vassalboro.
Eyers, J. T., Lowell.
McConachie, William, Clinton.
McGlone, E. F., Uxbridge.
McEvoy, F. F., Fitchburg.
McLaren, C. F., East Douglas.
Marley, John, Lawrence.
Leary, J. P., Northboro.
Hawkes, Charles W., Boston.
Doherty, Edward D., Maynard.
Henderson, J. J., Cordaville.
Hanlon, P. F., Worcester.
McCarthy, F. L., Fitchburg.
Oldfield, Ben, Methuen.
Mulligan, John F., Millbury.
Drury, Thos. S., Collinsville.
Gove, C. S., Uxbridge.
Hines, E. H., Monson.
Harney, P. J., Methuen.

Neff, A. C., Millbury.
Lyon, Thomas, Pittsfield.
Larosi, J. N., Cherry Valley.
Rim, W. B., East Douglas.
Lord, James F., Blackstone.
Smith, Thomas E., Uxbridge.
Starbard, V., Charlton City.
Keough, E. W., Middleboro.
Linnehan, J. W., Boston.
Klebart, F. S., Dorchester.
Clavin, James, Webster.
Shaw, Henry, Leominster.
Greenbank, G. W., Uxbridge.
Hedon, John, Monson.
Hillbury, James, Lawrence.
Fagan, Matthew J., Concord Junction.
Farron, J. P., Gilbertville.
Ahern, Wm., Worcester.
Allen, F. W., North Adams.
Aurry, Joseph, Millbury.
Connor, T. H., Clinton.
Arnold, R. H., Dedham.
Allison, Louis M., Worcester.
Buchan, Thos., Hyde Park.
Burke, Fred H., Lowell.
Birkinshaw, F. W., Waltham.
Brown, Frank A., Monson.
Battye, John, North Andover.
Brownell, M. C., Franklin.
Bennett, Frank P., Boston.
Cobb, Jas., Canville.
Babcock, F. L., Boston.
Chisolm, C. H., Boston.
Donlevy, C. T., Boston.
Copeland, George A., Waltham.
Harney, P. J., Methuen.
Kisro, Emil, Webster.

NEW HAMPSHIRE

Patterson, J. T., Hillsboro.
Parent, T. N., Franklin.
McBride, Robert G., Hillsboro.
Jones, Alfred E., Hillsboro.
Lord, Alfred E., Lebanon.

NEW JERSEY

Ashler, Jacob, Boundbrook.

OHIO

Louder, Moses, Piqua.

NEW YORK

Philbrick, W. V., Troy.
Bond, T. E., Auburn.
Moore, T. E., Herkimer.

RHODE ISLAND

Jennings, Thomas J., Pascoag.
Jones, Ernest W., Davisville.
Sutcliffe, Ernest, Providence.
Devine, Walter E., Providence.
Gledhill, Walter, Providence.
Eager, George, Peacedale.
Price, J. D., Ashaway.
Parkin, Tom, Olneyville.
Punece, Patrick, Manton.
Powers, Edw., Greenwich.
Perkins, F. W., Woonsocket.
Quinn, M. F., Pascoag.
Ringland, H. S., Providence.
Ringland, R. W., Oakland.
Orville, Perro, Woonsocket.
Taft, Edgar M., Bridgeton.
Tetley, Edward, Washington.
Lacey, William M., Pascoag.
Lancaster, J. E., Pawtucket.
Stewart, Henry, Pascoag.
Schofield, William.
Williams, Fred R., Pascoag.
Whitaker, H. E., Pawtucket.
Toop, James A., Washington.
Webster, David, Chipollutt.
Webster, David H., Manton.
Haedman, John T., Pascoag.
Hopkins, Henry, Providence.
Hamm, Lyman, Potter Hill.
Hazen, H. B., Davisville.
Hill, William, Oakland.
Hines, William F., Pawtucket.
Hill, Richard J., Woonsocket.
Clarkson, F. W., Glendale.
Cartlin, John, Manton.
Calnan, Jas. J., Fasway.
Gross, Ernest W., Pascoag.
Guerin, Julian J., Woonsocket.
Guerin, Joseph, Woonsocket.
Hurst, Charles, Providence.
Bidwell, George E., Woonsocket.
Brennan, T. F., Lafayette.
Brown, Chas. V., Lafayette.
Ainley, Albert, Mapleville.
Attridge, Chas., Providence.
Ainley, Ermott, Bridgeton.
Aurbach, Herman, Lymansville.
Fanning, Edward, Pascoag.
Geed, Charles C., North Scituate.
Burke, N., Carolina.
Coleman, George H., Pasway.
Campbell, John F., Providence.
Fraser, F. W., Glendale.
Dohncy, Edw., Woonsocket.
Dolan, J. T., Harrisville.
Wood, Joseph, Pascoag.
Ryan, T. J., Pascoag.
Rathborne, Henry A., Peacedale.
Kirox, James, Woonsocket.
Kirnicom, H. H., Providence.
Carmark, Jas. C., Woonsocket.
Curtis, J. B., Peacedale.
Dempsey, Edward F., Hope Valley.
Dicks, Lewis H., Woonsocket.
Doyle, P. F., Bridgeton.
Dunkan, F. J., Providence.
Jones, Jacob, Mapleville.
Driscoll, J. H., Manton.
Smith, A., Westerly.
Schortruace, R. C., Providence.
Stickley, James R., Peacedale.
Chase, Ralph, Washington.
Hitherman, John, Oakland.
Hay, William C., Woonsocket.
North, Charles, Washington.
Neiligan, M., Lafayette.
Marsden, James, Peacedale.
Hay, John E., Woonsocket.
O'Toole, Martin, Woonsocket
Brennan, Thos. F., Potter Hill.
Riendeau, Medric, Woonsocket.
Carmark, Louis, Providence.
Burnes, J. C., Providence.
McClintock, Harry, Woonsocket.
McCauley, F. J., Woonsocket.
Keegan, Charles I., Pascoag.
McGeough, John T., Woonsocket.
Hartley, F. H., Glendale.
Hackine, C. F., Providence.
Hollings, N., Providence.
Moore, John F., Centreville.
Kurze, O. A., Providence.
Kavanagh, George, Providence.
Thompson, Andrew, Tarkhill.
Southwell, James, Providence.
Murray, George, Mapleville.

VERMONT

Norberg, Carl A., Queechee.

THE TREATMENT OF MILL EFFLUENTS

BY WESSEX

The matter most difficult to remove from textile mill effluents is grease and—above all—wool grease. This it is which makes the sewage of Bradford and Roubaix the worst in the world from the point of view of those who want to precipitate impurities without expense and trouble and to send a clear, pure fluid into the rivers. The grease is the product of the woolwashing rather than the dyeing or finishing departments and by comparison dye-house liquors are no trouble. The eminent chemist, Professor Dewar, had something to say on this point in giving evidence in a Government inquiry at Bradford in 1894. Wool suds were "really far the most serious element," their large content of alkali and the way in which wool fat adheres to, and emulsifies with, water made their separation difficult and their settlement occupy a long time. "Any coloring matters," continued this witness, "combined easily with metallic oxides, but it was impossible to find anything with which the fatty matters really combined." J. H. Cox, late sewage engineer at Bradford, certified that dyewater was comparatively easy to deal with, although according to the evidence, the dye waters received were sometimes basic and sometimes acid.

At that period the Bradford town sewage was being treated with chemicals. At one period lime was used, then lime and copperas and ferric sulphate was employed at or about the date named. The treated sewage was passed over filter beds, and although more costly materials were tried, screened broken coke from the gasworks was found to give the best results as a filter medium. Among the materials found less satisfactory were crushed and screened clinker, crushed and screened sand, and mixtures of magnetic iron oxides with sand. In these days Bradford uses no other precipitant than sulphuric acid and its function is

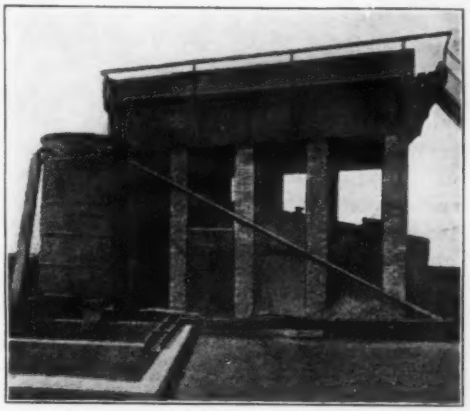
to neutralize the alkalies and liberate grease in the form of sludge. This sludge, containing 80 per cent. of water, is conveyed gravitationally to a ram working by compressed air. It is forced into tanks, heated by steam to 212° F. and after being further acidified is discharged by other rams into a press-house fitted with 32 steam-heated filter presses and 45 chambers. The presses squeeze out a mixture of grease and water that is run into separating tanks. The watery constituent is returned to the crude sewage, the grease is purified in a vat, run into barrels and sold as brown grease containing 70 per cent. of saponifiable matter. The excess of grease in the press cake disqualifies it for direct use as manure and some of it is taken for fuel. The rest is distilled at a high temperature, its grease is volatilized and recovered and a dry, powdery residue containing a little phosphoric acid and 1 1/2 per cent. of nitrogen is sold for mixing with artificial manure.

The outline describes the treatment devised by Mr. Garfield, the present municipal sewage engineer, for dealing with a flow consisting half of domestic, half of industrial refuse, in which wool grease is the refractory ingredient. As Bradford is spending $3,750,000 on new sewage works in which a similar process is to be carried on, its efficacy can be assumed and indeed the old works make a good profit. These formidable preparations are forced on the Bradford municipality by a law which states in its preamble that "the polluted and filthy condition" of certain rivers "urgently requires improvement." This statute makes it an offense to pass "any poisonous, noxious or polluting liquid" into a stream. The law does not require the decolorizing of dye-house effluents and consequently that matter receives relatively little attention. The inspectors of the Rivers Boards are especially at war with solids, fatty or non-fatty, and it is for the presence of these that the English dyer is most called to account. How the proportions vary may be seen from three analyses of dye water taken from three Bradford dye houses engaged in practically the same class of work.

	Grains per gallon (Imp.)		
	A.	S.	R.
Solids in suspension	18.06	23.10	9.66
Solids in solution	182	56	98.28
Total solids	200.06	79.10	107.94
Alkalinity .....neutral		13.03	22.29

Sample A: Black, with faint sewage odor.
Sample S: Brown, no smell.
Sample R: Pink, no smell.

It was apparently a recapitulation of the names of the chemicals used in bleaching, dyeing and printing cottons which drove Inspector Naylor of the Ribble Joint Committee to write: "It will be seen that the character of dyers' refuse is almost as objectionable as it appears. The color is very difficult to obliterate entirely, although this can be done with proper appliances." The Inspector, with an eye to further contingencies,



ARRANGEMENT FOR CLEARING DYE LIQUORS.

said that "thought of abstracting all dye in the dye houses must be dismissed until mordants are discovered which will take up all the color from solutions, and that quickly." The idea of exhausting the liquor absolutely by utilizing the whole of the dyeware in the coloration of the goods has possibly received less attention than might be desired. The ideas of manufacturers run rather to neutralizing waste liquors by mixing together fluids of different character, or to diluting one effluent with another to such an extent that harmful consequences are reduced to a minimum. Dyers using direct cotton colors have thought to improve mat-

ters by bringing together the waste from the dyeing and the bleaching departments. Dr. Hubner has pointed out that this is a mistake. Speaking especially of the direct cotton colors, he is opposed to dilution before precipitation, arguing that the effect is to make larger quantities of precipitant necessary and to reduce the precipitate to a fineness of division that makes it long in settling down.

In the case of dyers of wool goods some dilute the effluent of the piece-scouring department with the much more copious flow from the dyeing machines. Taken separately, the scouring waters would doubtless have to be passed through seak tanks to satisfy the authorities. Mixed with the dye-water they contribute towards a percentage of solids which keeps the producer always on the edge of trouble with the Rivers Board.

In one plant of this nature, designed to deal with 100,000 gallons a day, there are three settling tanks into any of which the effluent delivered from the pump can be directed. The liquor filters through coke and is finally sprayed automatically upon a circular coke filter, open at the sides and fitted with a revolving distributing arm. No chemicals are used as precipitants, but from time to time flocks are removed and the filter medium renewed. The effluent is manifestly improved and lightened in color by the treatment, but the bare 2 or 3 per cent. of solids, which after sedimentation in quart bottles appear to the eye as flocculent precipitates accompanied by a little grit, does not prevent the grumbling of the authorities. The plant cost $15,000 to build and costs $1,250 per annum to run and the guardians of the river press continually to have the equipment made larger. It is nothing to them that room for the purpose does not exist, that the pollution is trivial. They take no responsibility and give no guarantees that any measures will suffice.

Probably in the case of this plant improved results would be obtained by using lime, which costs relatively little to buy and throw in, but which would necessitate additional expense in periodical clearing out. "The treatment of waste dye liquors," say Messrs. Mackey & Miller, in a paper reported in the Journal of the Society of Chemical Industry, "usually resolves itself into the addition of lime alone, or a salt of aluminium, with lime or soda or both." They give a table showing the comparative costs per pound of the principal precipitants, also their neutralizing effect as compared with lime:

	d. per lb.
1 lb. Lime	.085
1.89 lbs. (= 1 lb. Lime) Soda Ash	1.11
1.43 lbs. (= 1 lb. Lime) Sodium Hydroxide	1.64
5.62 lbs. (= 1 lb. Lime) Barium Hydroxide	6.01
3.51 lbs. (= 1 lb. Lime) Barium Carbonate	2.07

The authors refer to 3 pounds of lime as a usual quantity to use to 1,000 gallons (10,000 lbs.) and note that if one pound of aluminoferric or copperas is added the cost is more than doubled, as extra lime is needed owing to the reaction between the lime and the sulphate. It is added that soda gives an inferior result to lime in point of color and that its principal use is with effluents to be used for dyeing or steam-raising after treatment. Aluminium salts are not recommended except where the precipitate is very light.

W. McD. Mackey of Leeds, joint author of the report quoted, is the inventor of an apparatus, shown at Fig. 1, for clearing dye water. Lime is used as a precipitant in a manner which avoids the need for digging it out of tanks. The effluent is run first to the tank on the high level, which is capable of holding half a day's supply, and into a compartment of this two or three pailfuls of lime are thrown daily. The liquid passes from the tank in at the bottom of a tilted cylinder (an old boiler serves the purpose) and it siphons from the top. Sludge accumulates within the cylinder and the liquor is cleared somewhat by filtration through its own precipitate. The water travels again upwards through a coke filter contained in another old boiler and issues clearer and slightly alkaline.

Scattered in patent specifications and scientific journals there are many references to the problems of clearing industrial effluents, but the compilers of books on sanitary engineering appear to have little to say on the subject. W. O. E. Meade-King, in a paper to the Institute of Civil Engineers,

draws attention alike to the need of a rapid system of clearing industrial waters and to the use for this purpose of blocks of compressed carbon which are procurable at low prices in any size. P. Rohland has pointed to the use of highly plastic clays as materials useful in separating colloids from crystalloids. Dr. Hubner has argued against the practice of allowing effluents to flow over blocks of the chemicals employed for precipitating purposes. An Englishman, H. Spivey, has protected the idea of forcing effluents upwards through a series of closed tanks the upper halves of which are partitioned with gauze and filled with filter media. There are questions, perhaps, not fully explained, of the part that bacteria and algae present in streams may play in clearing water from colored and other impurities. Dyers have noticed that rivers thick with foulness and blackness a mile or two upstream, yield water not entirely unsuitable for dyeing at their own address. Whether the settling down of solids behind the weirs is the efficient cause or whether the aeration of the water over the rapids has anything to do with the phenomenon is not so certain as that the effect does appear in practice.

IMPARTING LUSTER TO YARNS AND FABRICS

This process invented in Germany has recently been patented in the United States. It consists in making the goods quite wet and then calendering them at a high pressure and at a high temperature and at such speed that the goods remain wet after the calendering process. A brilliant and fairly lasting luster is produced by moistening and calendering goods under high pressure, at a high temperature so that the goods are dried by the calendering process. The improved process differs from the usual method by making the goods not only moist but quite wet and by accelerating the calendering process so that the goods are not dried, but are still moist or wet after being calendered. Wet goods are commonly passed around a steam-heated cylinder; but a lasting or permanent luster cannot be obtained in this way. The new process differs from this by the fact that the temperature used in calendering the goods must be at least so high that the well known Leydenfrost's phenomenon takes place, i. e., that the water, in contact with the heated surface of the rollers used for calendering the goods, does not evaporate at once, but forms spheres separated from the heated surface of the roller by a thin layer or coat of steam which retards the further evaporation of the water.

The new method possesses the following advantage: a higher and more permanent luster and a peculiar silver-like, glittering character of the luster. Furthermore, the goods are better protected against the burning effect of the heated roller used for calendering, and against the oxidizing effect of the air on the hot goods, so that much higher temperature can be used in calendering the goods than heretofore. The base and impermanent parts of the luster are removed in one operation without any special subsequent damping being required. The goods treated according to the present invention can be dyed after calendering, and thus obtain a much more uniform color than with the ordinary calendering processes for producing high luster on goods.

In order to provide the yarns and the like with permanent luster on both sides, they are passed through two calendering machines in series one after the other; the steel roller of one calender lies beneath and that of the other on top. In order to raise the flattened shape the yarns can, if desired, be subsequently soaked in hot water. Instead of employing simple pressure, the latter may be combined with friction, obtained by different speeds of the two rollers or placing them obliquely. In a similar way to yarns, other products consisting of vegetable threads can also be treated, such as woven goods, fabrics, etc., for which as a rule treatment on one side is sufficient. Any kind of roller, polished or engraved, may be employed as the pressure roller.

There are 156 mills, including both spinning and weaving in woolens and worsted, with 636,578 spindles and 16,451 looms, in the Leeds (Eng.) consular district.

Correspondence and Notes

UPON TEXTILE TOPICS AT HOME AND ABROAD

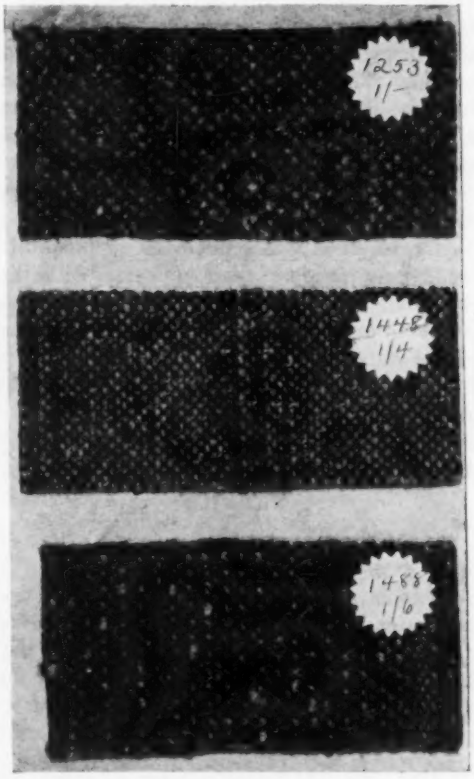
LOW GRADE WOOLEN CLOTHS IN YORKSHIRE

By Our Regular English Correspondent

Bradford, Eng., May 20, 1912.

A request received from a reader betrays a remarkable misapprehension. It assumes that it is possible to deal is one article with the whole business of buying, sorting, blending and pulling rags for the low woolen trade and to give besides a complete account of the spinning properties of different types, the sorts to use to produce particular effects and the costs of the incidental operations. It asks, in short, for more information upon the subject than has been put on paper since the invention of the art of printing. Nothing less than one volume could satisfy such a request and the probability is strong that it would then omit information that the inquirer wishes to know. Anyone who cares to make a search of technical books, lectures and articles may verify for himself the fact that exceedingly little has been published on the subject. This may be so either because there is little to tell or because skilled carders are less communicative than other ranks of mill workers. Both considerations operate in some measure. In its very nature the low woolen trade is more of an art and less of a mechanical proceeding, following hard and fast rules, than is the worsted manufacture. The materials available are more various, the effects possible are more numerous and the ways of arriving at a given effect are as many as there are persons trying to arrive at it.

The goods produced in the low woolen districts of Yorkshire are much the same in outward respects in all seasons. When wool rises the prices of yarns and fabrics seldom advance and they do not fall when the market eases again. Worsted yarn prices may fluctuate easily five times in a year, moving 10 per cent. up or down, while a carded woolen yarn made to answer a given purpose costs the same in 1902 as in 1912. Obviously this steadiness of price is not to be secured by adhering to any one class of material or any one composition of blends and it follows that no one set of instructions holds good for long together. The raw materials themselves change character in time and necessitate correction for quality as well as for price. Then there are different theories of blending and of cloth construction entertained by manufacturers making similar articles at similar prices.



SAMPLES OF LOW GRADE WOOLEN CLOTHS FROM YORKSHIRE. PRICES ARE FOR 54 INCH GOODS.

Smith, wanting to make a very soft yarn to be twisted before weaving with a hidden cotton thread will buy pulled new worsted rags, costing 18 to 20 cents a pound and use

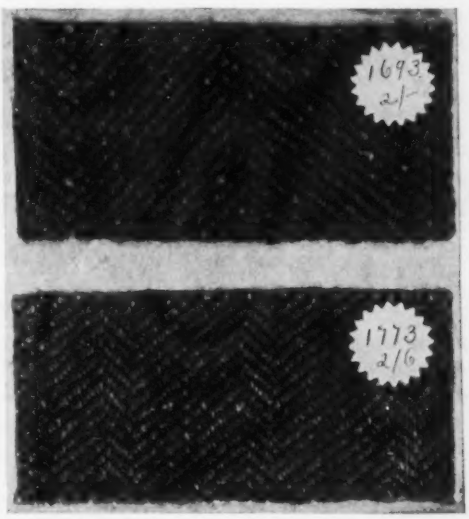
a very small proportion of better material, chiefly for the production of a mixture effect. Brown, aiming at substantially the same result, will buy cheap carbonized worsted pulled rags costing 8 to 10 cents and bring the mixture up to the required standard by a liberal infusion of suitable wool. The two cases represent the extremes. Their competitors, Robinson, Jones and others, will adopt some compromise midway between these two and all of them will believe their method to be the most advantageous, which it may be, for themselves and the particular circumstances of their equipment.

There is a considerable latitude in blending purely to reproduce one effect and there is latitude also in blending to fit a price. Mr. Butlin once gave the Huddersfield Textile Society an instance of how a blend might be varied in character to suit different purposes, the price remaining in all cases the same, 14 cents a pound. Translated into American equivalents the figures are:

Prices of Material	A	B	C	D	
Cotton, 16c.	28	17	19	24	lbs.
Fine worsted, 20c. (Rag wool.)	28	35	33	30	lbs.
Worsted waste, 9c. (Mill waste.)	44	48	48	46	lbs.
	100	100	100	100	lbs.

Each change makes its own difference to the strength or the handle, but leaves unaffected the net cost of the blend.

The matter reaches further than the choice and apportioning of raw material. One manufacturer will make warp and filling nearly equal in quality, where another will economize on the warp and put in a disproportionately expensive filling. "I made a very successful cloth for firms who were prejudiced against cotton threads," writes one manufacturer, "by making a black warp from black cotton waste and black low mungo at a cost of 4 cents a pound. This gave a sound yarn spun to 1 1/8 runs at a cost of 10 cents a pound. I used a better weft in all kinds of mixture colorings and after a good milling the cloth had all the appearance of a saxony mixture at a cost of only 48 cents a yard, 54 inches wide." The usual single cotton warp was in the first place too expensive for this emergency and would not have suited the purpose or the ideas of the customers as well as the woolen-spun cotton-waste and mungo. The illustration is used to show the width of the possibilities and it may be added that it is a common thing to find that more cotton is wanted in the warp after a seemingly satisfactory fabric has been evolved. Self gray soft flannel for athletic trousers at about 60 cents a yard is a regular Yorkshire production. One make of these began with 7 1/2 per cent. of cotton in the warp and, on the



SAMPLES OF LOW GRADE WOOLEN CLOTHS FROM YORKSHIRE. PRICES ARE FOR 54 INCH GOODS.

demand of customers who called for greater strength, this quantum was increased repeatedly until the percentage is twenty, although the softness of handle is the same as at first.

The proportion of cotton consistent with soft handle is not a matter of arithmetic, but of treatment in building and finishing the fabric. According to the accepted rule the proportion of Brazilian or Peruvian cotton in a blend should not exceed 10 per cent. if it is important that the effect should not be flattened and deadened. Apart from other influences and considerations this may be reckoned the prudential limit in yarn that is not concealed by softer material.

Names for low woolen material are only

names and bear different interpretations. Before playing the piano it is necessary to learn the notes, after which an infinite number of tunes may be produced. In carding the affair is the same. The notes are the different materials and the man who knows them, the length to which they can be spun and changes that can be wrought in them in finishing has it in his power to play tunes innumerable. He may conceive an idea for a blend which he thinks will produce a cloth at a selling price or begin at the other end of the problem and work out means of achieving the same result as in a given pattern. In any event, there have to be adjustments to suit the price or avoid the difficulties that are encountered as progress is made. Equally good manufacturers work upon opposing theories, one using much waste and little wool and the other using more long fiber and less short. Carders can tell more when samples are before them than by arguing at large as to the production of effects which words and figures can hardly describe and specify.

In practice the woolen manufacturer does not attempt to play all the possible combinations and permutations upon every variety of material. He settles down to the production of goods of one class, or within a certain range of prices, and perfects himself in the use of the comparatively limited number of materials eligible for his purpose or in the manufacture of a range of cloths of the same family character. With certain exceptions, the kind of cloth a Yorkshire woolen manufacturer will make and broadly the classes of material he will use can be foretold by noting his address. The Colne Valley tweeds, priced about 36 to 66 cents, are made largely with wool pulled from stockings or soft rags; the Leeds meltons and Morley unions with mungo fillings and cotton warps; the Batley heavy goods call for large weights of the cheapest stuff for backing-weft. Quality is of the first importance for certain makes and in others nothing much matters except the price. It is weight coupled with a certain minimum of strength and smartness that certain markets want for their money and elsewhere the real task is to duplicate the appearance of fabrics at one-half the price. One man by blending and stripping and dyeing utterly changes the appearance of the original pulled rag, while another buys rags sorted into colors, cards, spins and weaves them and issues them as woolen instead of worsted cloth. Excellent blue serges for boys' suits are made out of nothing more than pulled clippings of blue crossbred worsted from the tailors. Varying with price and other factors cheap woolens range from all woolen down to 80 to 90 per cent. cotton.

The possible combinations usable in manufacturing any one cloth are great and in such a range as has been outlined the variations are inexhaustible. In general, the manufacturer who is most concerned with the finer questions of quality, and least with the matter of giving great weight, does not buy raw rags. It suits him better to buy his materials pulled and the Colne Valley, for example, does not care to have its shoddy too much pulled. In buying waste professed to be pulled knit goods, these manufacturers like to see some remains of the original thread present. Knots, or pieces which cannot be opened by the pickers and cards, are not desired but divisible ends of thread are evidences of good faith. The manufacturers' task of putting pulled fiber into finished cloth is complex and absorbing and there is enough in the buying, sorting, rejection and pulling of rags to form a business of itself.

The rag puller and merchant is strictly comparable with the woolstapler who buys fleeces and improves them by rejecting some portions and putting like qualities together for the advantage of his different classes of customers; or with the topmaker who frees the worsted spinner from the necessity of disposing of wool and noils not useful to the spinner's purposes. Some of these large buyers go abroad for their rags and buy at the chief sources of collection. They have their own especial classes of trade much as manufacturers have and they buy with a view to suiting their established specialties. Their customers want constant supplies of standard grades or blends and look to them to maintain a set standard of quality. They buy on sample or after seeing bulk, at home

or abroad, and receive the rags in a more or less sorted state. If necessary they dry the rags by baking them in a hot room before passing them through the duster machine which shakes the dust out of them. Such as need it are "seamed" by girls to remove cotton thread and some rags wanted for goods guaranteed to be free from cotton have to be carbonized. The process is most often the wet one with sulphuric acid, but some prefer the dry process in which the cotton is carbonized by hydrochloric acid fumes. In certain instances the rags are dyed, or stripped and dyed, but that operation ordinarily follows upon sorting.

The puller employs a staff of sorters who become familiar with the classes of rags that he regularly buys and with his standards of quality. Rags bought in the Dewsbury auctions or from the larger grades arrive already sorted after one fashion or another and principally with regard to quality. These are resorted as to color—dark or light—or as to separate colors, usually at tables, but sometimes by girls placed along the sides of a conveyor belt. The thoroughness and extent of sorting are governed by the necessities, the demand for particular colors and by the market price for the time being. The number of handlings is according to the nature of the case and when sorting is finished the rags are ready to be sold or pulled. The sorting is done sometimes on ground floors, but preferably in upper rooms with traps in the floor down which rags can be shot into bins below.

The initial cost of the rags is increased by the number of handlings, by the lost weight of dust and of the bale-wrapper which is paid for at the same price per pound as its contents. Carbonizing implies a further loss of weight and a cost in steam, labor and materials of perhaps half a cent per pound. Dyeing may cost two cents or more according to the process and the color. Pulling involves not a loss, but a gain of weight nearly equal to the weight of oil used in the operation. The proportion of oil used is 15 per cent. normally and as the oil is usually cheaper than rags there is a temptation, which the wise puller resists, to use more. Manufacturers are not long in discovering whether they are being cheated in this direction. The cost of pulling varies with the output which in turn varies with the hardness of the rags. About one-quarter cent per pound is the conventional cost of pulling worsteds. The actual cost of reducing the rags to fiber ready for the picker room is a variable factor depending on the original condition of the material and the amount of work bestowed on it. The shoddy maker needs to do less for his home customers than for foreign ones in such countries as Russia where duty is charged upon gross weight. For some of these the pulled wool is carded, blended with colonial wool and oiled with the most expensive oils in the market, but these functions the local manufacturer performs for himself.

There are blends which are something like standard in given districts and used by the generality of manufacturers, but these are not necessarily the most profitable makes, as competition cuts the profits down, throws the business into the hands of the largest concerns and makes it necessary for them to work nights as well as days to earn a moderate dividend. The business in specialties is more attractive and most Yorkshire woolen districts have one or two manufacturers noted for their ability to use wastes which others reject as unusable. The waste dealers save for them the odd lots of mill waste which are picked up at nominal prices in company with larger bulks of more regular stuff. The handling of these is relatively more profitable for both parties than stock of recognized capacity and these economies permit advantages to be gained. In Yorkshire where a large number of able competitors are in the field remarkably profitable specialties are hard to discover and hold; and assuredly harder than in countries where skill is less abundant. The variety of possible means of arriving at a given result militate against exceptional profits. Waste competes with wool, but it competes with other wastes more severely, and some have found it their best course to climb out of the cheap trade

into the business in tweeds made from wool only.

No absolute rule can be laid down. In other circumstances manufacturers unable to get further by use of wool only have found their salvation in an adroit use of waste to cheapen production. The advantage is contingent upon the practice of other people. Where relatively plain, low woolens are made to simple and few designs profit depends heavily on full turnover and good buying and becomes a poor business. In dearer tweeds made from pure wool quantities are smaller and designs more numerous, but the margin rules higher and the maintenance of turnover is less of a bugbear.

[Our correspondent sent with the above article several hundred samples of English woolen cloths ranging in price from 7d (14 cents) to 2s 6d (60 cents) per yard, 54 inches wide. Five of these samples are shown in the illustration.—Ed.]

The consumption of wool during 1910 is estimated at 634,450 tons for the Continent of Europe, 274,000 tons for the United Kingdom, and 227,000 tons for North America.

A HAND BOOK OF WEAVES

By G. H. OELSNER, Director of the Weaving School at Werdau

Translated and Revised by Samuel S. Dale

This Series began in July, 1911

HERRINGBONE OR POINTED TWILLS

The true herringbone or pointed twill is one in which the twill at certain points slants in opposite directions from the float of one thread, as shown at Fig. 624. The twill runs to the right up to and including the fourth thread, which is common to both right and left twills. The float of the fifth thread forms a twill to the left with that of the fourth thread, and this twill is continued until the next point of reversal, in this case at the seventh thread, which is common to both right and left twills. The term herringbone is also applied to reversed twills in which a sharp break occurs when the twill is reversed, especially when the twill runs for a considerable distance before being reversed.

The pointed herringbone effect is obtained with a twill chain and a pointed drawing-in draft, No. 3. The simplest form of this

FIG. 624.

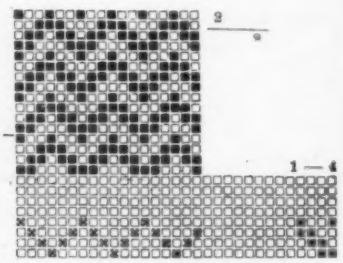
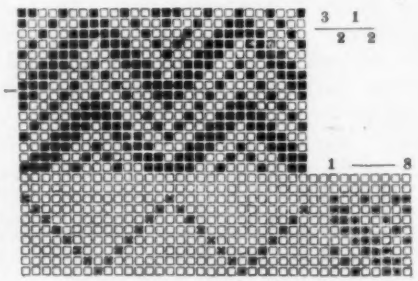


FIG. 625.



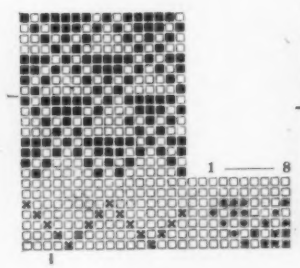


FIG. 626.

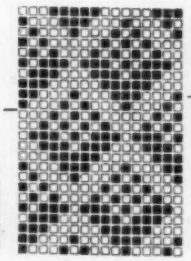


FIG. 627.

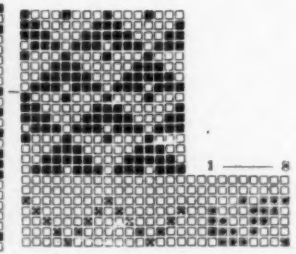


FIG. 628.

(Copyright, 1912, by Samuel S. Dale.)

draft consists in drawing in straight from the first to the last shaft, then reversing and drawing in straight back to the first shaft, as shown at Fig. 624. This brings but half as many threads on either the first or last shafts as are on each of the others. Figs. 624 to 630 are examples of pointed or herringbone twill with this method of drawing-in.

twill runs the same distance each time before its direction is changed. A great variety of zig-zag effects can be obtained by varying the distance over which the twill is carried continuously in the same direction. Several such patterns are shown at Figs. 631 to 635, the arrangement of the twill being shown in each case by the drawing-in draft.

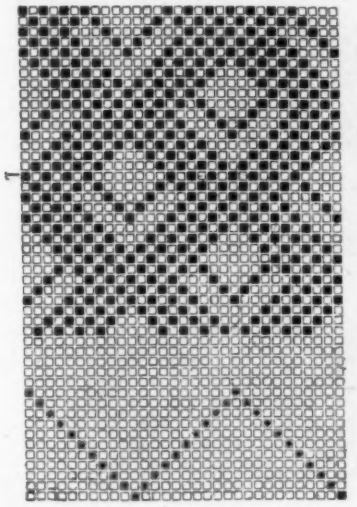


FIG. 629.

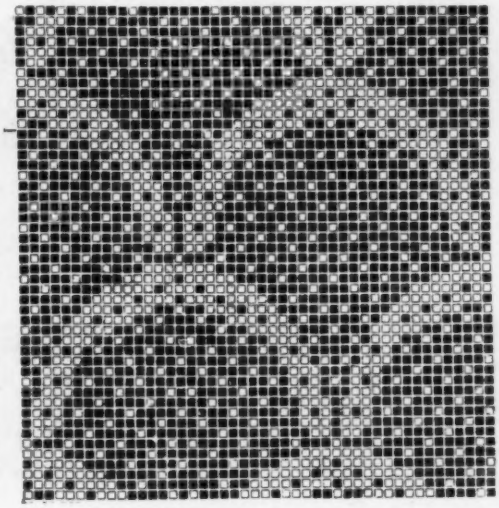


FIG. 630.

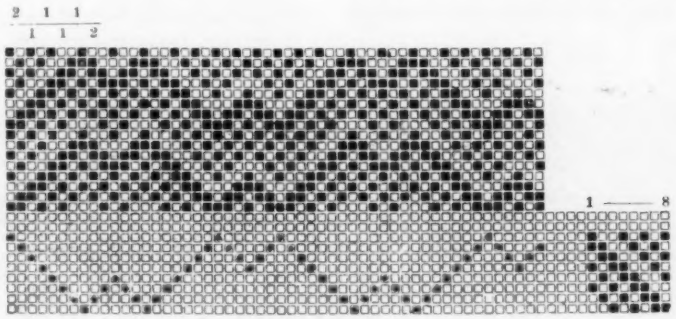


FIG. 631.

Fig. 624, twill $^{2}\!-\!_{2}$, 4-leaf.
Fig. 625, twill $^{3}\!-\!_{2}\!-\!^{1}\!-\!_{2}$, 8-leaf.
Fig. 626, 5-leaf twill.
Fig. 627, 6-leaf twill.
Fig. 628, 5-leaf twill.
Fig. 629, pattern 16 warp 16 filling.
Fig. 630, pattern 30 warp 36 filling.

In the foregoing pointed twill drafts the

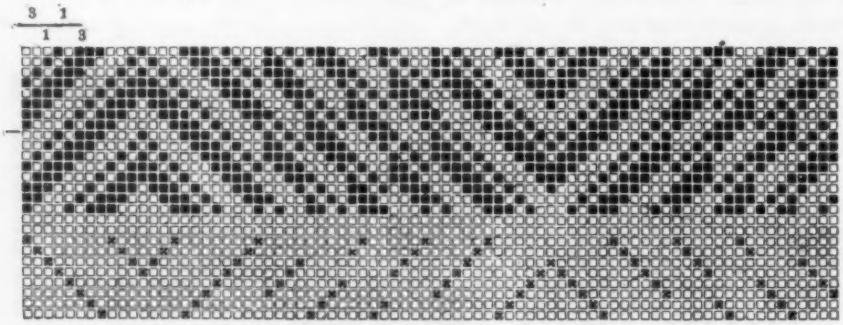
Fig. 631, twill $^{2}\!-\!_{1}\!-\!^{1}\!-\!_{1}\!-\!^{1}\!-\!_{2}$.
Fig. 632, twill $^{3}\!-\!_{1}\!-\!^{1}\!-\!_{3}$.
Fig. 633, twill $^{3}\!-\!_{2}\!-\!^{1}\!-\!_{2}$.
Fig. 634, twill $^{3}\!-\!_{1}\!-\!^{3}\!-\!_{1}\!-\!^{1}\!-\!_{3}$.
Fig. 635, twill $^{3}\!-\!_{1}\!-\!^{1}\!-\!_{1}\!-\!^{1}\!-\!_{1}\!-\!^{1}\!-\!_{3}\!-\!^{1}\!-\!_{8}$.

The twill in a herringbone weave can be arranged to bring the points at the side of the pattern, as shown at Fig. 638, instead of

at the top. For such weaves a straight drawing-in draft is used, the twill being reversed after a certain number of picks, as shown at Figs. 636 to 642.

Fig. 636, pattern 9 warp 16 filling.
Fig. 637, twill $^{3}\!-_{1}\!-^{2}\!-_{2}\!-^{1}\!-_{3}$.
Fig. 638, twill $^{2}\!-_{2}$.
Fig. 639, twill $^{1}\!-_{3}$.
Fig. 640, twill $^{2}\!-_{1}\!-^{2}\!-_{2}\!-^{1}\!-_{2}$.
Fig. 641, pattern 12 warp 22 filling.
Fig. 642, pattern 13 warp 24 filling
In Fig. 639 each third warp thread is

FIG. 632



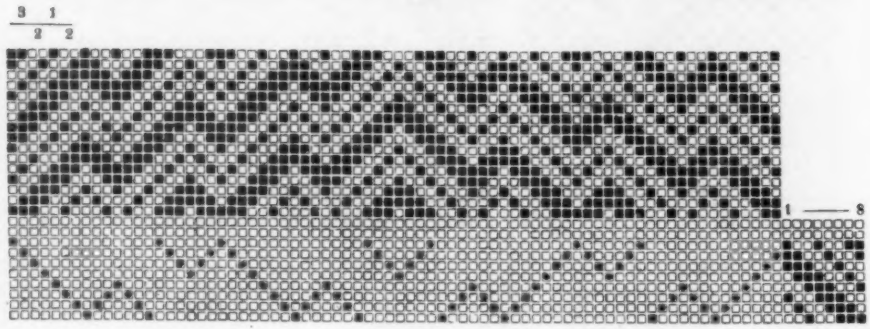


FIG. 633.

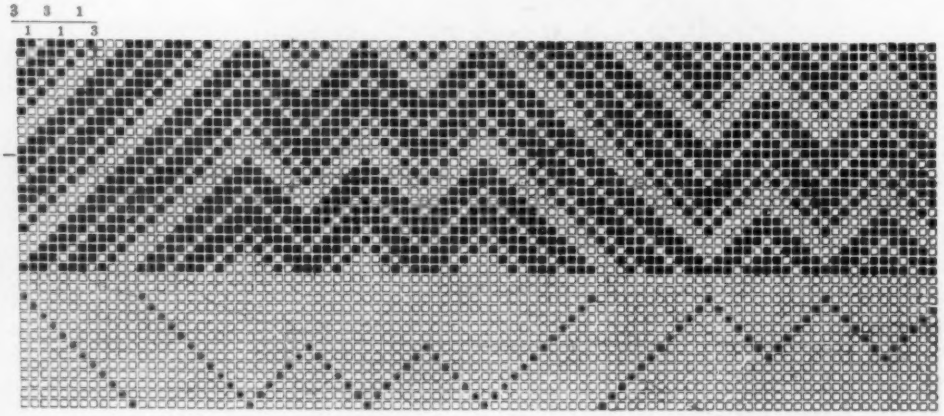


FIG. 634.

woven plain while the two intermediate threads are woven $^{1}\!/_{3}$. This makes the weave well suited for light weight fancy cotton warp suitings. The pattern is arranged to bring all the fancy threads on the plain shafts. The cotton threads come on the $^{1}\!/_{3}$ shafts and also on the plain shafts when the pattern requires it. The filling, ^{3}, which is wool, floats on the face in $^{3}\!/_{1}$ order, covering the cotton warp.

FIG. 636

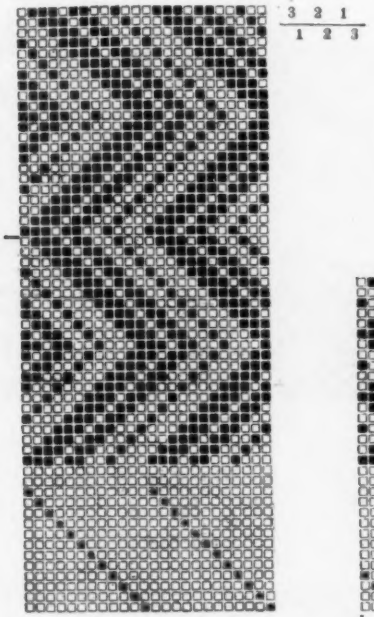


FIG. 637.

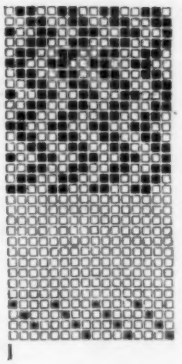


FIG. 638

FIG. 639.

FIG. 643.

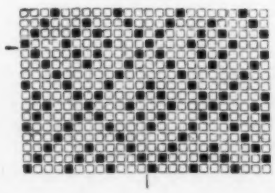
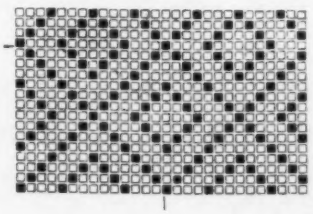


FIG. 644.



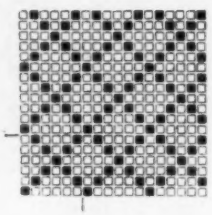


FIG. 645.

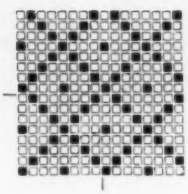


FIG. 646.

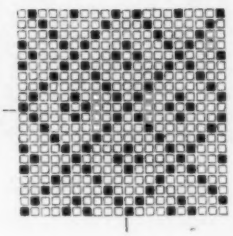


FIG. 647.

TWILLS POINTED IN BOTH WARP AND FILLING

By reversing the twill at intervals in both warp and filling the lines join at four points, forming squares. Pleasing effects are obtained when the diagonally opposite points are formed in the same way.

illustrated by Figs. 643 to 651. The twill, $^{1}/_{2}$, is the same in all, but each has one thread more from point to point than in the preceding one; Fig. 643, 6 threads; Fig. 644, 7 threads; Fig. 645, 3 threads; Fig. 646, 4 threads; Fig. 647, 5 threads; Fig. 648, 8 threads; Fig. 649, 10 threads; Fig. 650, 11 threads; Fig. 651, 12 threads.

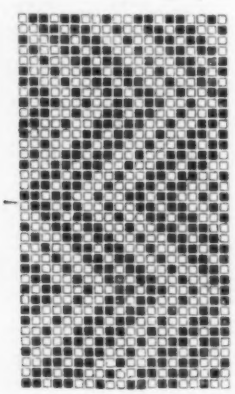


FIG. 640.

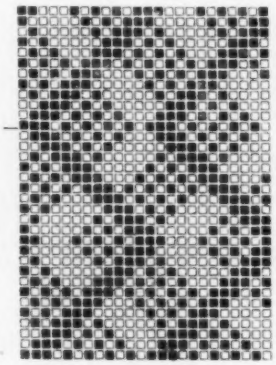


FIG. 641.

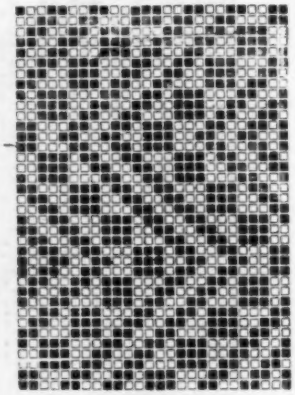


FIG. 642.

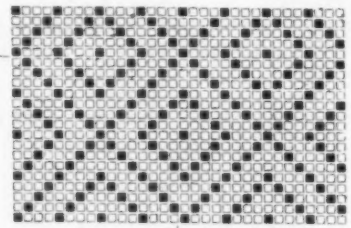


FIG. 648.

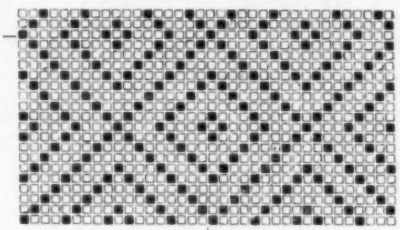


FIG. 649.

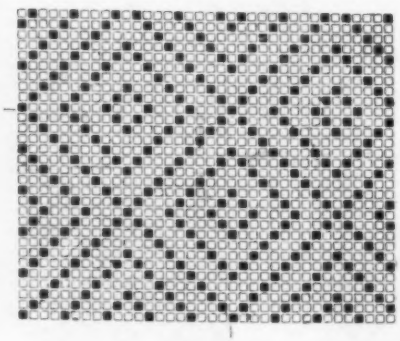


FIG. 650.

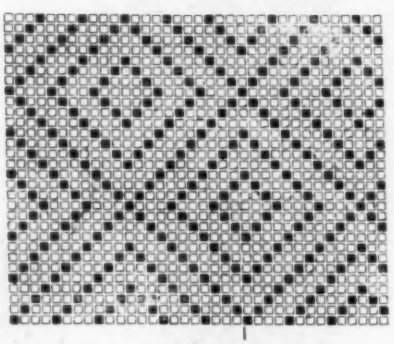


FIG. 651.

The patterns can be readily modified by increasing the number of threads from point to point in both warp and filling. This is

(To be continued.)

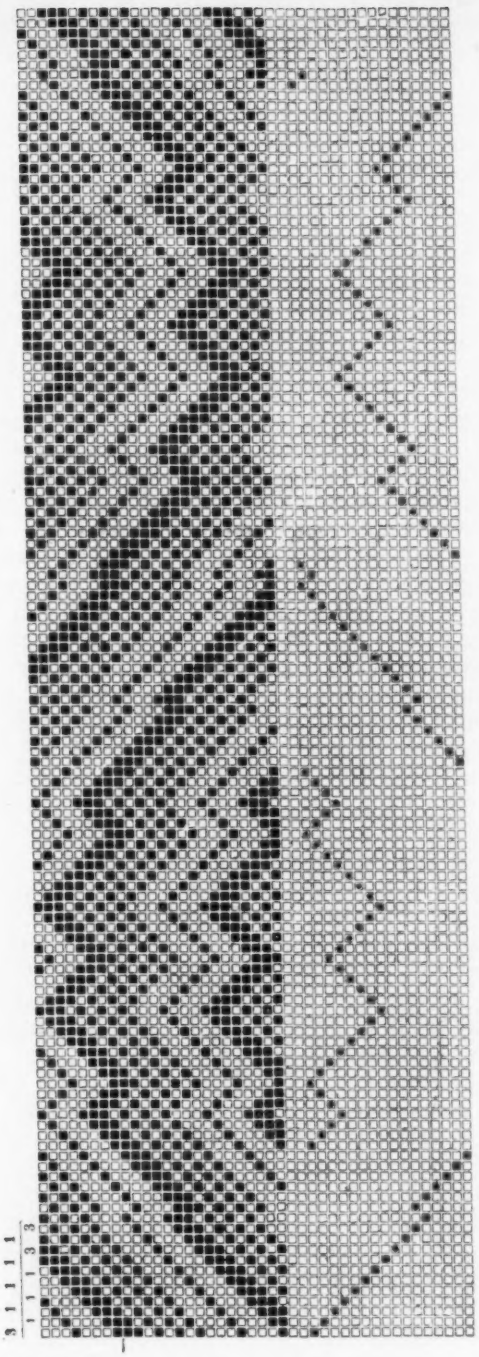


FIG. 635.

ROPE DRIVING

New York, May 18, 1912.

Editor Textile World Record:

Under the heading, "Speed Variation in Mule Driving," by James Strand, in your May issue, comparisons are shown between rope-driven cotton machinery and electrical motor drive, as used and tested by A. Kelly, consulting engineer of Manchester, Eng., using a Horn's tachograph. Three diagrams are shown, as follows: Fig. 1, Rope driven mule; time, 15 minutes; total variation 29 1/2 per cent. Fig. 2, Rope driven mule; time, 15 minutes; total variation 12 per cent. Fig. 3, Motor driven mule; time, 15 minutes; total variation 4 1/2 per cent.

Mr. Kelly gives no data as to how this rope-drive is working, such as, size of shives, number of ropes used, horse power wanted or whether of English or American construction.

It looks to me as if the lay out is too light for the work to be done. It would be well to have a competent mill engineer look it over and have same put in proper condition to do the work expected of it. A loss of 29 1/2 per cent. shows one of many things. Either the ropes are very slack or there are not enough of them, or the shive may not be large enough to give proper contact. Furthermore, the trouble may go way back to the main line shaft or to the engine. One would think in reading this article that a rope drive is not the proper thing. I claim it is and that it will give the best results if put up and operated properly. There are hundreds of them giving excellent results in this country today which were put up by competent mill engineers.

This comparison between rope-driven machinery and the electric motor drive is not fair to the rope drive, as the article does not give conditions for comparison. Some rope drives I have seen in fifty years of experience ought never to have been installed. This may be one of the cases. Others have been in continuous operation for twelve to fifteen years, with the same ropes in use all of the time, and have given the best of results. Give the rope a chance. As it cannot

tell its own story, someone must stand up for the rope.

Anyone who has had experience with electric power knows the electrical engineer will put in a motor to drive textile machinery or any other kind, only after finding out the extreme load by test, and will then provide the motor large enough to carry and with a sufficient surplus to overcome just what Mr. Kelly found with the rope-driven mule. If he cannot do it his way it is not done at all, but not so with the rope drive. That is left to the mill mechanic. No technical man is called in as in case with electric motors. The rope drive is put on to do or not to do the work expected of it. I do not say this happens in every case, but I have found it that way many times in my travels and in good mills at that.

Yours very truly,
C. E. Dailey.

ENGLISH NOTES

By Our Regular Correspondent

Bradford, Eng., May 20, 1912.

The business in hoods for automobiles becomes quite considerable in amount and specialties are offered for this purpose at much higher prices than the usual cotton. These are waterproofed and sold as camel hair, although some of them owe as little to the camel as most of the machine belting called after that animal. The goods are not intrinsically worse for the purpose on that account. The kind of "camel hair" of which they are composed was made, up to a few years ago, by bleaching Spanish black wool to a fawn shade in peroxide. Then it was seen to be advantageous to pay dearer for a lighter colored wool which could be dyed instead of bleached. The present practice is to buy Persian and other coarse, strong wools of eight inches or so in length, mix them with any strong hair (human included) and get a dyer to put on as much pink or yellow as is needed to produce the standard camel tone. The tops cannot be dyed over sticks, but are easily treated in vacuum machines and are dyed in Bradford at about two cents a pound. The dyed top spins better than the bleached and has replaced it. The fabric woven from this yarn makes superior golf-bags and is, of course, much more durable than jute for all services of this kind.

* * *

The Colonial Wool Buyers' Association, representing the frequenters of the London wool sales, have promulgated a program of reforms. They want starred lots (i. e., lots of one to three bales) to be sold not after the auction of the large lots, but simultaneously and in a separate room. At present these are only reached late at night. They want bids of a farthing (1/2 cent) to be accepted on wools up to 20 cents instead of to 16 cents as now. And also they want to have it explicitly declared that the buyer of one lot must immediately declare his price for the next lot in order to gain the privilege of preference. This committee is empowered to take drastic measures to obtain these concessions from the brokers.

The limit of 16 cents was fixed 24 years ago when wools were four cents cheaper than now and to raise the limit is really only to restore the original position. Under the existing rule a buyer who has been advancing by steps of 3 per cent. is called on to jump 6 per cent. as soon as the arbitrary line has been crossed. Under the amended rule he would have to advance 5 per cent., and even this is twice the height of the step immediately preceding. The matter is partly one of direct arithmetic and partly also an attempt to break up the abuse of the "last buyer" privilege. By naming eight pence as his own bid the last buyer forces his competitor to raise the price one cent or see the lot pass. There is no room to doubt that the change is as much in the interest of sellers as of buyers.

* * *

After a day in court the seller and buyer of a secret process for improving the luster of cotton linings have amicably composed their differences. The finish is that known as "Radium," invented by Palmer, perfected by J. P. Bemberg, Barmen, and bought under license by Denison, Preussner & Co., Bradford. Four of the $5,000 installments had been paid, but the purchaser objected to meet the fifth, and last, under circumstances which illustrate the difficulty of dealing in secret methods. Another German firm,

Kleinerwefer's, was aiming at the same object as Bemberg's and had bought Alderholt's patent, in which moisture, pressure and steam were used and of which the prime defect was the liability to make cloth tender. To curtail competition in Germany Bemberg bought the Kleinerwefer system and this coming to the ears of the English purchasers led them to protest that the process sold was the Alderholt and not the Palmer. In the long run, all imputations were withdrawn and as a result one learns the market price of a secret process for making cottons permanently lustrous without greasiness of handle. The $25,000 of the contract gave Denisons the right to use the process themselves in England and to license any other parties than the Bradford Dyers' Association to use it.

* * *

A substantial majority in Parliament has been gained for a proposal to extinguish the half-time system of labor in English mills. Under the existing law children of twelve who pass the doctor and have a sufficient number of school attendances may work half a day in the mill conditionally upon spending the other half in school. At fourteen years of age they obtain full exemption. The proposed change would keep children in substantially all cases at school until the latter age is reached. Thirty thousand half timers work in English textile mills, chiefly at cotton and worsted spinning, but some in flax and silk. The reason is not always the poverty of the parent, the welfare of the child or the indispensable requirements of the industry. In some cotton districts the custom survives as a custom rather than a necessity. In the worsted trade it is difficult to say how a sufficiency of labor could have been got during the last three years without the half time supply, and managers are very positive in asserting that a later beginning in mill work will mean seriously worse yarn in the finer counts. The school teachers are against half time and with them are sentimentalists who make imagination take the place of experience. Only a few enunciate the doctrine that the system is good as a system and that a gradual and early initiation into mechanical operations is a valuable part of the training. Some of them prophesy that if the division of tasks is abolished today it will have to be revived in one form or other tomorrow.

* * *

Paper yarn apparently finds a larger employment in various directions, for the German makers of Silvarin report a turnover of 448 metric tons (2204 lbs.), against 217 tons in 1910. The cost of production has been reduced, but the concern is faced with the necessity of finding more capital or seeking liquidation. The books of this concern, when examined two years ago by eminent London accountants, showed that the selling price amounted to nearly 6 cents per pound and that the cost (excluding supervision, establishment expenses and depreciation of machinery) was less than 3 1/2 cents. It is to be supposed, therefore, that the burden of the excepted items has been unduly large. Great prejudices against the material is reported, simultaneously with larger sales to carpet manufacturers and insulators of wire and prospects of better business in paper sacks. Paper makes no perceptible headway in any direction where fineness of count is a consideration. About 6s or 8s cotton count is the finest number of which any mention is made.

* * *

A new measure against the piracy of their patterns is being taken by Yorkshire makers of fine worsted and Scottish makers of tweeds. The whole trade is being asked to subscribe to a memorandum asserting that patterns are secrets of trade until such time as the pieces made to those patterns are delivered. A declaration by all the dealers and the manufacturers makes as strong evidence of what trade custom is as could possibly be desired and would give the courts something substantial to go upon in any legal proceedings taken thereafter. The interest of the bona fide buyer is the same in the matter as the interest of the seller, and a large number of adhesions are expected.

* * *

Since the time when Helmuth Schwartze & Co. began their careful compilation of the production and consumption of raw wool there has been a largely increased consump-

tion of woolens in the Southern Hemisphere and Asia. This affects in some degree the validity of a comparison based on the weight of wool produced or received in Europe and North America and on the population of those continents alone. It is, however, the business of statisticians to keep the bases of their comparisons intact and the position could only have been obscured by change. If the number of wool users has increased south of the line, the number of persons who wear little wool has increased also in some countries of Europe and some States of America and the one consideration has to be balanced against the other. To trust Messrs. Schwartze, we have had in 1907-11 substantially the same per capita allowance of clean wool as in 1891-1900. During the sixties, the visible supply was 2.26 lbs. per head, which rose in the seventies to 2.43 lbs., in the eighties to 2.57 lbs., attaining the maximum of 2.76 lbs. in the nineties. With the new century the tide turned and in 1901-06 the fall was 5 1/2 per cent., reducing the available quantity to 2.61 lbs. The tables show during 1907-11 a gain of 4 per cent. and a quantity of 2.72 lbs. per head of the North American and European population. The allowance of 1 lb. 11 1/2 ozs. per man, woman or child, will probably be exceeded during this year, but the balance of probabilities says that an allowance of about this weight is as large as supplies are likely to be for a long time to come.

* * *

The French system of worsted drawing continues to be used in Yorkshire mills, but its particular merits are being diligently pointed out in the textile schools. Machines illustrating its operation are installed at Bradford and Leeds. The Leeds University possesses a fairy godfather in the person of the Clothworkers Company of London. This descendant of the medieval gild of the same name has expended $800,000 in land, buildings and experimental teaching plant at Leeds and with its last benefaction the authorities are displaying the Continental system of spinning. Smith's combs and gills and Platt's drawing frames have been erected and the University is equipped with plant for all purposes from wool carbonizing up to cloth finishing. The machinery is driven by different means to illustrate various systems of mill driving and it is worked upon a limited scale. In spinning and drawing one or two spindles or heads are supplied with material. In weaving the production is chiefly section-ranges in lengths no greater than is necessary for the subsequent finishing. The cards are narrow and fitted with alternative feeds and condensers. The looms are hand looms for beginners, leading up to a use of power-looms of all main types. Apart from machines kept for general demonstration there are some separate ones intended for individual experiment and research. The day-student pays $155 a year and has a choice of four schemes of study occupying two to four years. To obtain diplomas students have to take three subjects outside those distinctively textile, selected from engineering, French or German, applied art, mechanical drawing, chemistry and physics. Reversible and raised fabrics occupy much of the attention of students at present.

* * *

The Tariff Board report on the cotton industry has excited altogether less attention in textile England than its predecessor upon wool. The reason may be that the American market for goods is of less active concern to cotton men than to their worsted neighbors. Again it may be that Englishmen, rightly or wrongly, have arrived at the conclusion that nothing likely to be done soon to the American tariff is going to have important consequences for them. It is remarked that the report shows the duties to be in excess of the needs of the case and the pages in which the Board discusses the incidental detail of the duties on fabrics have been commented upon. A newspaper which dealt severely with the report on schedule K finds the cotton report more compact, coherent and conclusive, but it ends with a suggestion that the Board bestows more attention on small than on large matters. It will not be surprising, however, to find the report frequently referred to hereafter whenever there is any question of comparison between American and English costs. The fact that the document deals almost exclusively with English practice and barely mentions Continental ways is accepted as nat-

ural. That passage which shows how, by undervaluing particular goods as little as 1/4 cent, a sum of 1 1/4 cents can be saved in duty has caught English attention. Textile men here have plenty of opportunity of seeing how foreign duties work out and how closely to the wind importers are fond of sailing. To choose neutral instances, say that a fabric is not officially "wool and silk" unless the silk forms 5 per cent. of the weight. The man in trade becomes aware of a demand for goods containing 4 3/4 per cent. of silk. Say that a tariff is arranged like the French one on woolens so that the heavier the weight per yard the lighter the duty. Say that 13 ounces marks the division between a higher duty and a lower. The manufacturer finds plenty of demand for cloths weighing just over the arbitrary thirteen ounces and perhaps no demand for anything else until the next tariff limit is reached. It is simple experience that business tends to focus itself around these joints in the armor. The buyer wants goods which are practically the same as those which bear a heavier impost and wants these nearly always. Nobody of export experience in this country will belittle the desirability of having tariff limits which are clean-cut and hard and fast, or will deny that there is a continual contest to make the best of artificial tariff situations.

PUNISHING PIRACY IN FRANCE

From Consul Carl Bailey Hurst, Lyon

The court of appeals in Lyon has just confirmed a judgment rendered by a neighboring tribunal of commerce as to the copying of certain designs of cotton textiles of local manufacture. It is often extremely difficult to render a decision in such a matter, even with the help of disinterested experts. A good design is sometimes reproduced in certain particulars, perhaps improved upon, but otherwise changed so that it is developed into another design.

It was shown that the designs in question were copied from samples confided to the defandants on which to take orders for the plaintiffs, who are manufacturers. It appears that the defendants had collections of samples of different manufacturers of cotton goods and that all of these samples had a distinct individuality, according to the house from which they came, and that a customer, to whom the defendant sent the samples, ordered goods presuming that they were made by the plaintiffs. The contention of the defendants that the collection of samples confided to them by different manufacturers became their own property and that they were entitled to manufacture such goods if they choose was held as altogether inadmissible.

AWARD AGAINST DEFENDANTS

The tribunal held that the defendants were intermediaries selling at such prices as they might choose to ask on samples that had been submitted by the manufacturers; that the intermediaries tacitly contracted with the manufacturers in accepting their samples to give such manufacturers all orders taken on their respective samples, a custom in accordance with the most elementary commercial loyalty. It was proven that the goods manufactured by the defendants after the designs furnished by the plaintiffs were of inferior quality and less attractive in appearance; that a customer who had ordered the goods, expecting to get products of the plaintiffs, was able to see that the goods ultimately received were not so good as usually supplied by the plaintiffs, and that this confusion was to the detriment of the plaintiffs.

In the United States trade designs, when patented, are accorded the full protection of American patent procedure, the relative paragraph of the law reading:

> A design patent may be obtained by any person who has invented any new, original, and ornamental design for an article of manufacture, not known or used by others in this country before his invention thereof, and not patented or described in any printed publication in this or any foreign country before his invention thereof, or more than two years prior to his application, and not caused to be patented by him in a foreign country on an application filed more than four months before his application in this country, and not in public use or sale in this country for more than two years prior to his application, unless the same is proved to have been abandoned, upon payment of the fees required by law and other due proceedings had, the same as in cases of inventions or discoveries.

The patenting of designs is quite customary among the textile manufacturers of the United States.

Questions and Answers

Under this head we undertake to answer, free of charge, to the best of our ability, questions pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD RECORD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

If the question is not of general interest to textile readers and involves expensive investigation, a charge covering the cost may be made, of which the inquirer will be advised before any expense is incurred.

BOILING OUT WARP CHAINS

Editor Textile World Record:

Please state the best method of boiling out warp chains for mercerizing. Hertford (2023).

The best method of boiling out warp chains for mercerizing is to catch the liquor from the mercerizing process and use it for the boiling-off process with the addition of more caustic soda to bring the liquor to about 4° Tw. Boil the goods in this for the required time, and if they are wanted scoured, boil for 4 to 5 hours. Then wash off and neutralize with a weak sour. If the goods are to be bleached a good white, make the liquor stronger and boil a little longer. If the liquor is dark from the boil run off the kier and wash off, mixing a fresh, weak liquor of caustic and boil off again. This will remove all dirt and cause the goods to come out even in the dyeing, not impairing the luster. It is necessary to watch the liquor after the second boil to see that it is not dirty. If the dirt is not removed in the boiling process all the chemic in the country will not produce even dyeing, as the stains will show up after the goods are dyed.

Delco.

PLACING ORDERS FOR HOSIERY

Editor Textile World Record:

When do jobbers place orders for light weight woolen half-hose, boxed goods, about 1 1/2 pound to the dozen? What are the usual prices and terms to the manufacturer for the hose that retails for 25 cents a pair? When do the retailers place their orders for these goods, and what are the terms and prices to the manufacturer?

Merino (2027).

The usual time for jobbers to place orders for light weight woolen half hose is from November 1st to the middle of January, and this class of goods is usually sold to them at from $1.70 to $1.90 with terms, 3%/10 or 6%/10.

Retailers begin placing orders for the same class of merchandise about the first of February and a great many of them do not complete their buying until the season is on in the fall. They usually expect to buy this class of goods from the jobber at $2.00 to $2.25, but if a manufacturer came along, they would, of course, expect lower prices from him. The fact of the matter is, I do not believe it practicable for the manufacturer to sell this class of goods direct to the retailer, for the reason that retailers buy woolen hosiery of all kinds in very small quantities and in order for a manufacturer to do a successful business with the retailer, it would necessitate being in a position to ship small packages and would also necessitate carrying stock from which he could ship quantities from one-half dozen and upward at any time that the retailer might wish it. Being obliged to sell in such small quantities, would necessitate more traveling salesmen with correspondingly increased expenses.

Fillmore.

WASTE IN THE MANUFACTURE OF SWEATERS

Editor Textile World Record:

What is considered a fair average of waste per dozen of sweater coats at the prices and production as given below:

$4.75 to $12.00 per dozen; 12 dozen a day, on circular knitting machines.

$12.00 to $18.00 per dozen; 7 dozen a day, on circular knitting machines.

$18.00 to $35.00 per dozen; 8 dozen per day, on flat knitting machines. Lewis (2017).

It is rather difficult to give a fair estimate of the waste made, as the quality of yarn and the gauge of machines, as well as the sizes from which sleeves are cut, are all factors in the problem. For the $4.75 to $12 per dozen, boys' sweaters, 12 dozen a day, 4 pounds of waste would be a fair estimate.

For the $12 to $18 per dozen sweaters for men, 6 pounds would be a fair estimate. For the $18 to $35 sweaters, it is rather difficult to give an estimate, as jersey sweater coats are often called flat goods. For the $18 a dozen jersey sweater with a production of 8 dozen a day, 8 pounds of waste would be a fair allowance. For a $35 a dozen Shaker sweater coat there would be about 3 ounces of waste to the dozen. On this class of goods there is very little waste, as the goods are made to size and any waste pieces can be back wound and knit over. The ravelings are used to sew or knit the sweater together. These estimates include winders' and knitters' waste, or in fact all waste up to the finished product. Bristol.

WOOL PULLING

Editor Textile World Record:

I would like information regarding the method of pulling wool from sheep skin.

Derby (2026).

A reply to the above inquiry appears in this issue in the form of an article on wool pulling by Robert Dantzer of Amiens, France, who has had many years of practical experience as a manager of a wool pulling establishment.

BLEACHING STRAW

Editor Textile World Record:

Kindly give me a formula for bleaching which was used on the enclosed piece of straw.

Garland (2030).

It is impossible to give a formula to produce a bleach exactly like that used on the sample of straw submitted. A white like this would have to be obtained more by experiment than by any hard and fast rule laid down in any formula or process. Some manufacturers are using the sulphur bleach for this class of goods. This method of bleaching, however, does not give a pure white. It is my opinion that the peroxide bleach has been used in this case. This bleach can be adapted and regulated to produce many different shades. The goods can be left in the bath until the desired result is obtained and unless there is some mistake in the neutralization of the bath there is no danger of tendering the goods. The results, to be successful, would have to be gained by experience. Delco.

WET STRETCHING MACHINE

Editor Textile World Record:

Can you inform me who are the builders of a machine or stretcher used a great deal in Europe to crab woolen, worsted and cotton yarns?

Finisher (2034).

Our English correspondent replies as follows:

"Finisher" is apparently in search of what dyers call a "wet setting" frame, Fig. 1. It is used by Yorkshire dyers in treating those

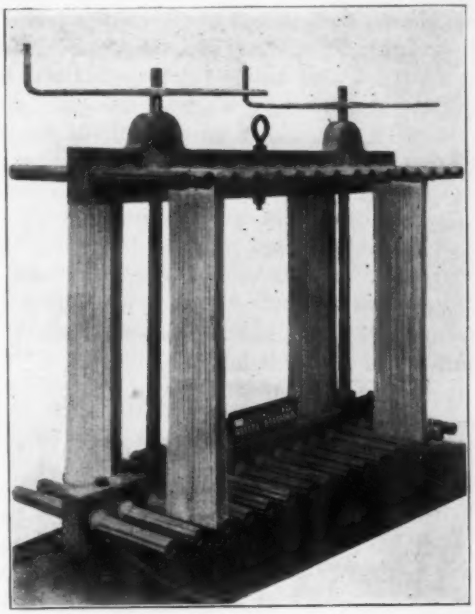


FIG. 1.

yarns that would become unwindable if they had not, preparatory to dyeing, been "set" in boiling water. As the illustration shows, the hanks are placed upon the pegs, at first slackly. The screws are worked to supply tension and the frame is lowered by a crane hook into the boiling tank. This is the simplest form and is the one generally preferred by practical men. It is built by Knowles & Co., Bradford, the American agents being Edward Jefferson & Bro., 117 South Second St., Philadelphia, Pa.

A dry-setting or hank-stretching machine is used for yarns less liable to contraction and in this the hank is rotated under a ten-

sion which is regulated by a lever and if desired the yarn can at the same time be brushed. Regent.

LUSTER ON SATEENS

Editor Textile World Record:

Enclosed are two samples of sateen. One of them has a stiff, papery finish, the other is a sample of sateen that has not been treated. Please inform us how we can treat the second sample so as to give it the stiff finish of the first one. He would like to know what sizing to use and also what machinery is necessary. We have drying cans and the stretcher for sizing, but do not get the finish right. Luster (2012).

A finish to imitate the sample of black stiffened sateen lining can be obtained by the use of a three bowl starch mangle. The thickening (starch) should be made up as follows:

20 lbs. Potato Starch.
1 lb. Beeswax.
½ lb. Paraffine.
½ lb. Tallow.
50 gals. Water.

Boil well. To this mixture add for the purpose of giving it luster

½ oz. Sulphate of Soda,

and to impart the rustle

2 ozs. Chlorine of Sodium.

Dry, batch and allow to cool, dampen and then calender. If one passage through the starch has not imparted sufficient stiffness give a second run. Then pass the goods to the beetling machine and run until the right finish is obtained. If "Luster" has only a two bowl machine a second run may be necessary; if no beetling machine is available a "rear finish" could be obtained with the friction calender. John D. Street.

Our French correspondent to whom this question was referred replies as follows:

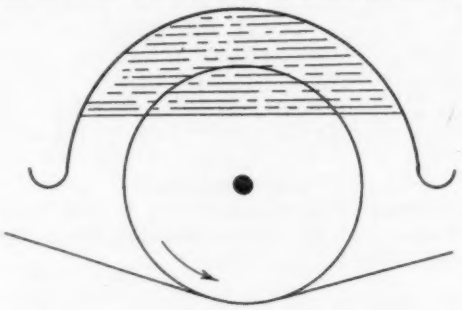
I have examined the samples submitted and find that the finish on the one which it is desired to match can be obtained by using the following composition:

Flour ..... parts	17.5
Cornstarch	12.5
Tallow	2.5
Cocoanut butter	1
Refined carbonate of soda ..	.25
Solution of logwood	80
Bichromate	.02

Water is added to make 500 parts of the mixture which is boiled for 30 minutes. This quantity is sufficient for 1,300 yards of cloth. The solution of logwood is prepared by boiling the following mixture for two hours:

Chip logwood fermented, parts	50
Water	300

The cloth is finished on both sides by passing it over a roller running in the solution, shown in the accompanying illustration. The



cloth then passes to a cylinder dryer which has about 12 copper cylinders heated by steam. The cloth is then slightly dampened and finished a second time, after which it is dried. After the second drying the cloth is slightly dampened and then left for twenty-four hours, after which it is run through a hydraulic colender. Robert Dantzer.

SIZING FOR KNITTING YARNS

Editor Textile World Record:

Some knitters use a solution on merino and worsted yarns; others steam the yarn or treat it to get better results in knitting. On fine counts in particular, ends very frequently break in the knitting process, causing waste. It is claimed that treating the yarn makes it elastic and will give better results in knitting. Can you advise us what this process is? Knitter (2016).

The process of steaming for merino and worsted yarns is not very satisfactory. It shrinks the wool and causes the yarn to be uneven. Steamed yarn very often bothers the knitters by adhering to the needles. There is also great danger of corrosion unless the yarn is oiled. The old system of running the yarn over a smooth roll which revolves slowly in a trough of emulsion gives the best results. Some knitters believe that the yarn is improved if it is left undisturbed for a day or two after being wound.

In my opinion, however, it is best to put it up as soon as wound, as it lessens the danger of shrinkage and if used at once may be safely dampened a little more than would be permissible if it is to be kept a week or so before being used. An olive oil emulsion gives good results. Winwick.

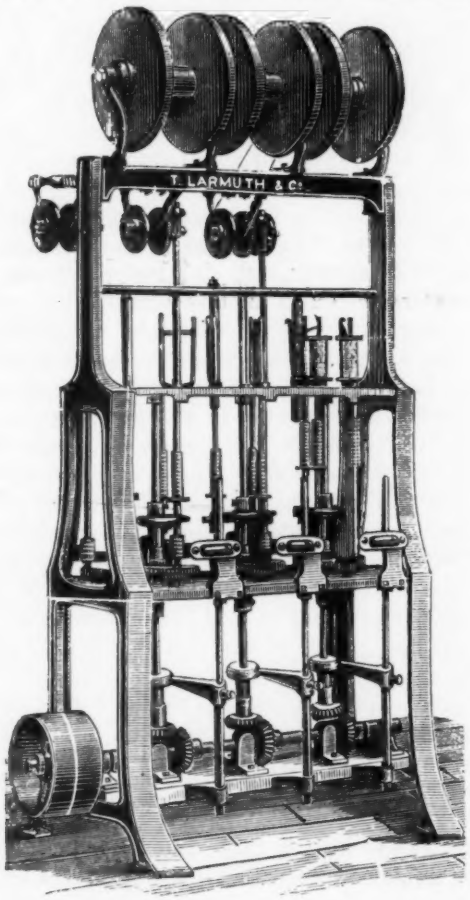
CORD-LAYING MACHINERY

Editor Textile World Record:

I enclose samples of upholstery cords and would like to know the sort of machinery used in making these, also anything about the process.

Manufacturer (2005).

The samples are two-fold and three-fold cotton cords of various twists and sizes.



A MACHINE FOR MAKING COTTON CORDS.

The process and machines used are quite simple and readily understood by anyone who has seen a flyer-spinning frame. In the "James'" machine made by T. Larmuth & Co. power is supplied through a bevel gear to an upright shaft and transmitted through a train of cogs to a set of two, three or four flyer spindles. The cord used is wound upon flat-ended bobbins and is drawn-off and twisted by the flyers. The yarn from the two, three or four bobbins is led through an eye and thus laid into the form of a rope. The rope or cord is passed under a friction-roller and wound upon a large creel or bobbin fixed in a bracket on the top of the machine. The creel has a positive drive from a pulley in connection with the friction roller.

The twist is regulated by change-wheels and variation of twist is avoided by the regularity of the take-off motion. Uniformity of tension is secured by weights counterpoising the tension of springs by means of weights on the foot of the spindle. On the breakage of an end the weight descends and the particular head affected is thrown out of gear. Machines are made with from one to thirty-six heads and for bobbins of varying diameters. Wessex.

BLEACHING POWDER FOR KNIT GOODS

Editor Textile World Record:

In looking over a technical paper I find it stated that the amount of bleaching powder required for 1,000 pounds of knit goods is 50 pounds. This is far below what we have been able to get a good bleach with and I wish you would advise us what amount of bleaching powder should be used for bleaching 1,000 pounds of goods. We make up our bleaching powder with equal parts of soda ash and chloride of lime and run the goods twice through the solution at 1 1/2°, using sulphuric acid to sour with. Dexter (2024).

Theoretically 50 pounds of bleaching powder might be sufficient to bleach 1,000 pounds of knit goods, but in practice more would be required. When scientists experiment to determine what would be required to produce a certain result, everything is brought down to a fine point, every grain of chlorine would be extracted from the bleaching powder, and the sediment would be washed and rewashed until every particle is extracted. On the other hand, the material used in the test would not contain any surplus water to neutralize off the action of the chlorine and reduce its bleaching power. There are a great many bleacheries handling knit goods, piece goods and raw stock, in

which the chlorine is not thoroughly extracted, because it is not allowed time to settle and be washed off thoroughly. In these bleacheries the water is not extracted thoroughly, in many places the squeezing does not get them dry enough, thus reducing the strength of the chlorine. If under boiled more chlorine is required to get a white, and it is only a poor white at that. It is a well known fact that oxycellulose will be produced in 4 1/2 to 5 hours with chlorine at 4° Tw. and left for this length of time. "Dexter" may not know that mixing the chemic powder with soda ash, thus producing the sodium hypochlorite, which is the bleaching agent then, will necessitate a longer time in the bath to produce a good white with less risk of tendering the goods. If it were possible to get the goods right in the boil, all the dirty water washed out and the goods fairly dry without carrying any surplus water in the chlorine bath, then 50 pounds of bleaching powder would be sufficient for 1,000 pounds of goods, providing, of course, care was used in mixing the bleaching powder and all the chlorine extracted. It takes too long to wash off the powder to the last pinch where it is a question of production. Time is too valuable to be washing a sediment to extract a few grains of chlorine. When a bleachery is being built is costs but little extra to duplicate or even triplicate a mixing tank with lower tanks for settling purposes. I have always claimed that it takes too much chlorine to bleach the cotton at the present time. Dulcimer.

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EMULSION FOR BALBRIGGAN YARN

Editor Textile World Record:

Kindly give us a formula for making the solution or emulsion which is used by manufacturers of balbriggan underwear in winding the single yarn onto the large bobbins. Utica (2029).

The following formula is a good solution for balbriggan yarn for underwear:

2 lbs. soft soap,
1½ pts. oleine or light spindle oil.

Water to make three quarts. Boil until thoroughly mixed, when the solution should be of a creamy white color. The oil used must be stainless so as not to show on the goods after knitting. The solution is put on the yarn in the following manner:

A trough about four inches deep, and the full length of the winder, is attached to the winder in place of the regular tension rod. A tin roller is then made about three inches in diameter with a small shaft in the center of each end, and adjusted in the trough to the depth of about two-thirds of its diameter, leaving one-third above the trough, with brackets on each end of the trough for the tin roller to revolve on. The roller is slowly revolved by a small driving pulley attached to the guide shaft. If the roller is revolved too fast, it will spatter the solution over the machine, and if too slow, it will not take up the solution fast enough to size the yarn properly. The knitter can regulate the speed of roller to suit his requirements, as to the quantity of the solution he wants on the yarn.

The yarn as it is being wound from the cop on to the bobbins which are used in knitting, passes over the surface of the tin roller and takes up the solution; the roller being constantly kept wet by revolving in the solution in the trough. Some knitters believe that it is necessary to have a mixture of this kind in order to knit balbriggan yarn properly. With the exception of one mill where I had charge I have never used any solution for balbriggan or other cotton yarn, and have successfully knit cotton goods, balbriggan and white cotton, up to a production of 700 dozens per day, and with twelve plain feeds on a twenty-inch cylinder, spring needles. It is, however, a well known fact that cotton yarn knits best with a certain amount of moisture, and that in hot weather it becomes dry and non-elastic and brittle, thus causing holes in the knitting. To provide this moisture, I had humidifiers put in the knitting room, and in hot weather, cold water was used in them, and in cold weather steam, and with these I kept the whole knitting room at a certain degree of humidity, so that the yarn in being wound would absorb moisture. Lafayette.

Knitting Department

THE KNIT GOODS SITUATION

The continued backward weather of the month just past has so retarded the sales of light weight underwear that some of the manufacturers who were far behind on their orders have had an opportunity to catch up to some extent.

Retailers in every section are complaining as a result of getting March weather in April and April weather in May, but still it is felt that with a couple of weeks of warm weather, a heavy demand will develop and compensate for some of the cool weeks that we had last year in June.

Stocks are by no means heavy, notwithstanding the weather conditions. Retailers and jobbers placed comparatively small orders and the manufacturers have curtailed their production to such an extent that stocks have not accumulated, except some small lots of women's straight vests in the lower grades and a few lots of women's shaped vests and pants.

Manufacturers of men's balbriggans all report that they are still behind on their orders and some of the larger manufacturers of this class of merchandise state that they have all the business on their books that they care for during the balance of the season.

Conditions are such as would justify manufacturers of many lines in asking higher prices, as it is costing considerably more to produce goods today than it did when the prices were named, but there are not buyers enough looking for merchandise to encourage the sellers to take this stand. As a result, practically all of the duplicate business is booked at early prices.

There is one noticeable feature in the demand for women's combination suits. The trade seem to have tired of knit suits with lace trimming at the knee and are taking in their stead garments made with tight fitting knee. There is a shortage of suits answering this description.

The call is changing gradually to plain stitch garments in vests, pants and suits and while in some localities the tuck stitch is still taken freely, yet the majority are calling for the finer looking fabrics. It is believed that the plain stitches will come into general use in the light weights, as it has already in heavy weights. There is also noticed an increased call for silk underwear for women. This is perhaps due to the fact that so many lines of silk hosiery are being offered at very low prices. This call is being answered by a few manufacturers who are putting out silk vests made low neck sleeveless to retail at 69 cents and upward. It is believed that another season will see many lines of this class of goods in the market.

Jobbers report a good advance sale of fall weights in all lines, except in flat wool goods. A number of makes have been advanced since our last issue, the more noticeable being the women's carded yarn vests and pants to retail at 25 cents. These were priced early in 6 pound at $1.75, 7 pound at $1.85 and 7 pound extra sizes at $1.90. They have now been advanced generally to $1.90, $2.00 and $2.10. The 50 cent grades of combination suits that were offered during January and February at $3.37 1/2 and $3.50 are now being held as high as $3.62 1/2 and $3.75.

Retailers have shown a decided interest in lighter weight fabrics for women's goods for fall and so strong has been the call for these that one of the largest and most important manufacturers of worsted ribbed goods has introduced several new lines in both cotton and worsted, and are featuring a specialty of vests and suits made low neck, sleeveless; low neck, wings; and low neck, elbow sleeves.

Many buyers have been in the market during the past month, cleaning up spring business and looking about for any jobs that might be picked up. It is said, however, that they have shown more interest in making in-

quiries regarding new spring business than they usually do at this time of the year. It is not believed that any great volume of business was placed, any more than that some buyers have agreed to take their usual quantity of certain staple lines, providing the prices were to be so and so, but it is interesting to note any interest being shown at such an early date.

There was a meeting on May 8th at which 21 manufacturers of underwear were represented and at which it was attempted to set a date for the opening of spring lines, but there appeared a difference of opinion as to the advisability of fixing upon any definite date and as a consequence no agreement was reached.

HOSIERY

Hosiery manufacturers are very busy. The more desirable lines of hosiery are in a well sold up condition and except for some little activity occasioned by the planning of lines for the new spring season, little is being done in the sales department at present. It might be possible to do considerable business, as there are any number of buyers who express themselves as ready to place orders for early deliveries, if they could get the manufacturers to accept them, but the fact of the matter is, very few manufacturers are in a position to take care of any immediate orders and it is very common to hear of orders for 10, 25 and 50 case lots being turned down. There are, of course, as there always is, a few manufacturers of less important lines who will take orders and promise delivery in three to four weeks, but it is noticed that in most of these instances, advance prices are obtainable and delivery dates pushed ahead as far as possible.

There is an actual shortage among jobbers and retailers of a great many better grades of hosiery, but more particularly in full fashioned lines. The production of all the fashioned machinery in this country is sold up for many months ahead, and the Chemnitz district is not in a position to help out to any extent, as their production is also well taken care of. The acuteness of the present situation probably will have the effect of bringing buyers into the market at an early date ready to operate for 1913, and it is expected that this will make an early and short selling season.

There is much discussion in regard to the prices for another season. On one hand it seems as if manufacturers must get higher prices than now prevail, as the goods cost more to make, but on the other hand the buyers say that limit prices have been reached. The goods must reach the retailers to sell at certain prices. As these prices are fixed on the denomination of the various coins of the country, they are not likely to change and the only course left for the manufacturer is to cheapen his production to fit the prices.

There has been no change during the month in the popular call on hosiery. It still consists almost wholly of black, white and tan. A few black laces are being sold in the higher grade silk goods and an occasional call is heard for certain colors to match certain shades of gowns, but this demand is hardly enough to mention.

In men's half hose, the call is for black, tan, navy and grey in cotton, lisle and silk. Aside from the above, about the only call worth speaking of is a trade that is being done on two tone and Jacquard effects in the better grades of silk.

THE STENT SYSTEM

BY WINWICK

Probably most of the practical knitting mill men will know at once what this system is; but for the benefit of those who may not be acquainted with this method a word of explanation may be needed. In many mills, it is customary in some departments to divide the work each morning, giving to each operative a certain portion of the day's work. When this portion is completed, the stent is said to be finished and the operative is allowed to discontinue work for the day. Undoubtedly this system has been in use many years, but the writer is of the opinion that the system ought to be abolished for the following reasons:

First, It has a tendency to promote undue haste. Every operative has a desire "to get

out first" and although the work must be kept up to a certain standard to pass inspection my observation at close range leads me to believe that the operatives would do better work if they were not trying to get out early.

Second, If all the best operatives get out an hour per day early a certain percentage of the work, which ought to have been done by them, has to be done by those less skilled, and the product of the department is by that much brought below the proper standard.

Third, There is always dissatisfaction on account of short hours with short pay in departments run by this system. The overseers are inclined to protect themselves against sudden losses by a little overloading with help, and this still further shortens the day's work.

Fourth, It is not scientific management to overcrowd one or two departments and run others with a shortage of help. This often causes a loss of production.

Fifth, With more help employed in a department than is necessary, more machinery and floor space are required.

Sixth, Even though piece prices are paid, the operatives are not getting a day's pay, because they are not provided with a day's work. In all probability the piece price is at least 5 per cent. higher than would be entirely satisfactory if the operatives were continuously employed. The stent system thus operates at a monetary loss to both the operatives and the manufacturer.

What would I do if I were temporarily short of work in my department? Well! Provided my crew was just right, for numbers, to handle the work under normal conditions, I would keep them all busy until we were nearly caught up, then send them out for a day, retaining a few of the oldest and best for special work. In this way the production would be kept up to the standard. A day's work would mean a day's pay. The help would be better satisfied because they would realize that I was doing my best to keep them busy all the time. And if they had a whole day to themselves once in a while they could plan for and enjoy it.

THE UNIVERSAL WELT FOLDER

Hosiery manufacturers are familiar with the difficulty in producing straight sewed welts of regular lengths on ladies' hose. The

FIG. 1

defects resulting from the old method of folding by hand are shown at Fig. 1, it being

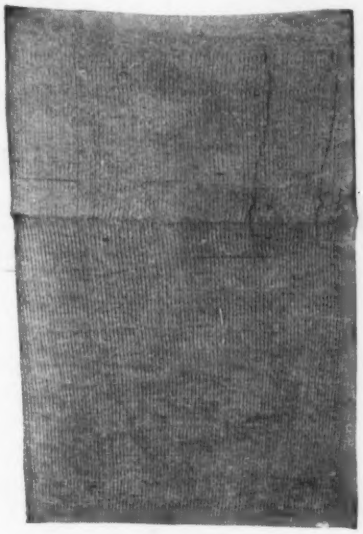

FIG. 2.

next to impossible to fold them straight and of uniform length in this manner. The

"Universal" welt folder, for which W. D. Butz, 625 Bourse Bldg., Philadelphia, Pa., is

FIG. 3.

FIG. 4

the sole American agent, is designed to overcome this difficulty, a sample of the work

FIG. 5.

FIG. 6.

being done shown at Fig. 2. The "Universal" welt folder takes out the twist or curl of the fabric and throws the wale or rib of the hose, both in the welt and the leg, in perfect alignment. The folder results in increased efficiency and improves the appearance of the goods.

The operation of folding with this ap-

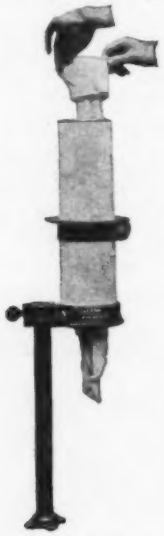

FIG. 7.

paratus is shown at Figs. 3, 4, 5, 6 and 7. The operator first takes hold of the stocking at the top and passes it down through the cylinder with the toe first. The stocking is then pulled over the cylinder as far as the adjustment ring. The fabric is then telescoped up to the top until the welt is formed. The welt is then picked off with thumb and first finger of each hand, ready for sewing. The folder can be easily adjusted to suit any length of welt. There is nothing about it to get out of order or to wear out.

SNAP FASTENER FOR KNIT GOODS

The Alma Mfg. Co., 650 South Munroe St., Baltimore, Md., is bringing out the "Norfolk" snap fastener, especially designed for knit goods and textile garments. It is already used by a number of manufacturers of sweaters, fancy knit goods, mufflers, etc. They make it in a variety of finishes to meet any requirements desired. A sample card showing the different styles of fasteners may be had upon application.

THE MANUFACTURE OF SWEATERS

BY WEXFORD

The manufacture of sweaters is of interest to a large number of knitters at the present time, some of whom are making them on latch needle frames and allowing their spring needle frames to stand idle. Others would like to make them, but do not want to go to the expense of putting in special frames. A good cheap sweater can be made on a spring needle frame. It is a 2-thread coat made on a 12 gauge cylinder with cut pressers, pine-apple stitch, Fig. 1. The pressers are cut 2 and 2, so that they press 2 needles and skip 2. It can be run either with 2 or 4 feeds; 10 to 14 inch cylinders are run with 2 feeds and

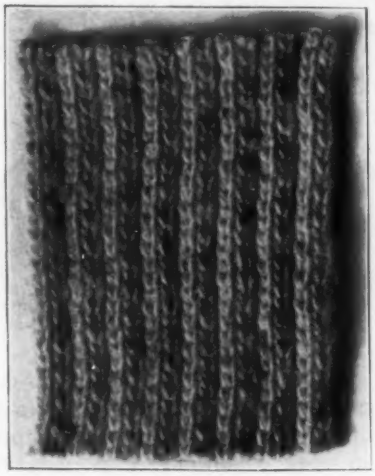

FIG. 1.

cylinders 15 inches in diameter or larger have 4 feeds. The needles have to be divided in the cylinder according to the number of feeds. The pressers are cut 2 and 2, which makes a combination of 4 and on a cylinder with 2 feeds the number of needles are divided by 4 and have a remainder of 2. With a 4-feed cylinder, divide by 4 with no remainder. The two threads are run in one stitch burr with round cloth wheels and if the frames are set up right they can be run with as low a grade of stock as can be made to spin or wind well and not have any more waste in cutting than could be used for pocket pieces. There ought to be enough for that purpose.

In setting up the frame the cloth has to be put on the needles with plain pressers. After the cloth is on the needles take the cut pressers and start one feed at a time. We will start with a 2-feed frame and number them 1 and 2 and also number the needles 1, 2, 3, 4, 5, 6, etc. No. 1 feed with the cut presser will press needles 1 and 2 and skip 3 and 4. No. 2 feed will do the same, press 1 and 2 and skip 3 and 4. Then comes No. 1 feed again and if the needles are divided right No. 1 feed will press 3 and 4 and skip 1 and 2, and No. 2 feed will do the same. On a frame with four feeds No. 1 feed will press 1 and 2 and skip 3 and 4. No. 2 feed will do the same. No. 3 feed will press 3 and 4 and skip 1 and 2. No. 4 feed will do the same and the stitch is complete.

To make perfect cloth it is necessary to start at the picking room to get the yarn right. The first operation is the rag picking. Have the pickers sharp and keep them that way and see that there are no small pieces of cloth carried into the blow house. If this is done the garnet machine will not be required to do the work the pickers should do. Next see that the garnet machines are well brushed up and that the stock is not pilly. If it is pilled up the cards cannot straighten it out again. The batch should be layered evenly and if the stock is cotton batch no water should be used in the emulsion. To get a good production the cards and jacks must be speeded to the limit as the knitting frame with two threads in a feed can take care of all the yarn spun.

In knitting the cloth the outside of the goods on the cylinder is the right side of the fabric and the knitters should be cautioned not to soil it. The goods are not washed, but are turned in the roll and go direct to the cutters where they are cut up in sets or case lots and numbered and put into trucks. The sets or case lots are kept together until they get to the shipping room where they are put into cases. The misses' or boys' goods are cut out of 10 to 15 inch rolls; the ladies' or men's, from 14 inch up.

Any number of combinations of color can be used by having the borders or tubing down the front a different color from the body. The usual colors for the body of the

coat are gray, blue, maroon and white. The border and coat are cut out of the same goods. An 18 inch roll is laid out on the table about 6 feet long, and the same as the body rolls, but it is cut into strips lengthways of the goods. The strips are cut different widths as desired. For the men's and ladies' sweaters the width finished is about 2 inches, that will take a strip 5 inches wide. For the boys' and misses' it is cut 4 inches for 1 3/4 inch border. It is then rolled on a reel and is ready for the border machines. The sleeves are cut out of small rolls according to the size wanted and a cuff is made to go on the sleeve on a small 3 1/2 or 4 inch latch needle frame, the same as is used for fleece lined goods.

From the cutting room the sets go to the operatives, who cut the V shape in the neck and put on pin tags with the size stamped on. From here the goods go to the hemmers who hem the bottoms. They then go to the seamers who seam the cuffs on the sleeves, and seam in the sleeve and the body. Then the borders are put down the front. From here they go to the operatives who tip the ends of the borders on the bottom of the coat with an edging machine. Next they go to the cover seamers and then to the markers who mark the spaces for the buttons and buttonholes. The next process is making the buttonholes and sewing on the buttons. If pockets are put on the garments go to the pocket sewers and then to the inspectors and from them to the packing room.

TWO-COLORED HOSIERY STAMPS

The attractiveness of the gold hosiery stamp by the decalcomania process has led to its very general use on all classes of hosiery. Some manufacturers and jobbers of high grade hosiery who wanted to get something original have hit upon the idea of a two-colored stamp. Lord & Taylor were the first to use a red and gold transfer stamp, the idea being to get something that would show up well on light silk hosiery and light colors generally, as well as to get away from the plain gold stamp which so many manufacturers of the lower grades of hosiery were adopting. Since then a number of other progressive firms have fallen into line to take early advantage of this new and attractive proposition, which in a way is almost as radical a departure from the original way of marking hosiery as the gold stamp was. They may be procured in any desired designs from Palm, Fechteler & Co. (Dept. K), 67 Fifth Ave., New York.

A COLLAR FOR KNITTED GARMENTS

The knit collar shown in the accompanying illustration has recently been patented in this country. The inventor gives the following account of the garment: The collar is intended for knitted sweaters, the object being to provide an improved method of forming collars in order to increase the durability and enable the garment to be adjusted in different forms by the wearer. Fig. 1 is a front elevation of the coat showing the improved collar in open condition. Figs. 2, 3 and 4 show different ways in which the collar can be buttoned.

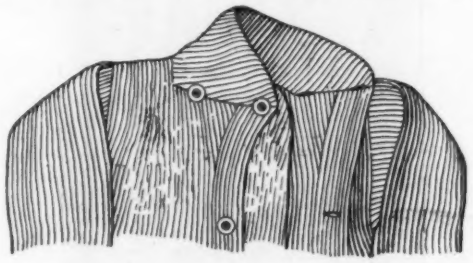

FIG. 1.

The collar is stitched at the seam to the upper portion of the garment and extends to the edges of the border ribs upon each side of the coat opening. In proximity to the collar the border ribs are offset from the rib's body and between them are a number of widening wales formed in the fabric by adding extra needles to the machine during the process of knitting and in effect causing the border ribs to extend at each side of the coat opening for a certain distance toward the opposite side of the opening, and with the collar affording normally overlapping lapels.

The buttons are secured to the garment on the line of the seam, giving a relatively

firm suspension for the button securing stitches. A button is desirably set near the apex of the lapel while another button may be located near the turn of the collar upon the shoulder of the garment. Buttonholes may likewise be formed in the seam and set near the apex of the lapel and at the turn of the collar. The buttons are thus set equadistant upon either side of a medial line if projected upwardly through the buttons of the lower portion of the coat; the buttonholes are likewise normally positioned in the same relative positions upon either side of a line extended upward.

FIG. 2.

FIG. 3.

FIG. 4.

FIG. 5.

The garment may be used as a coat for relatively warm weather by simply opening the lapels to either side, as shown in Fig. 2, disclosing the throat or shirt collar and necktie of the wearer.

Fig. 3 shows the button and the buttonhole in engagement, affording a loose fit of the collar about the neck and a single breated effect over the chest. A button and buttonhole in this form are idle. A further method of wearing the garment, though not illustrated, is afforded by turning the upper edge of the collar outwardly, somewhat in the manner shown in Fig. 5. Fig. 4 represents the garment with the lapels upon either side of the coat opening overlapping at the throat with a button and buttonhole in engagement and another button similarly secured in a buttonhole. The garment is thus suited for cold weather by reason of its snug engagement about the neck and the double-breasted condition over the throat. Both lapels are secured in fixed condition and will lay smoothly and comfortably about the neck of the wearer however violent may be the exercise undergone. The buttons when secured in the respective buttonholes cause the lapels to assume symmetrical positions relative to each other, the coat and the person of the wearer.

Fig. 5 illustrates a further application of the collar when buttoned as described for Fig. 4. The collar is rolled outwardly in the style usually obtaining in sweaters used in the navy and has heretofore never been successfully accomplished in a coat sweater. This style is especially comfortable in moderately cold weather and presents a pleasing and peculiarly neat appearance.

THE BOILING-OFF OF SILK KNIT GOODS

BY JAMES CHITTICK

In the past two or three years there has been an enormous increase in the production in the United States of silk knit goods of all sorts, gloves, socks, stockings, neckties, underwear and what not. During this period the annual output of such articles has probably been doubled, helped on by the low prices of raw silk that have prevailed, and the consumption of silk by this branch of the industry is estimated by careful observers to have reached 20 to 25 per cent. of the total raw silk importations. Many firms now producing silk knit goods, having had no previous experience with this material, are often perplexed by problems arising in connection with it.

One respect in which silk differs from all other textile fibers is in its boil-off, a feature which few knitters would be likely to be familiar with, and in fact one with which many regular silk manufacturers are but superficially acquainted. When the silk worm spins its filament, which emerge in the form of a double strand, or "bave" as it is called, the material of which it is composed is of two natures, a soluble part known as the sericin, or gum, and an insoluble part called the fibroin, or fiber. This soluble gum envelops the filament and causes the two sep-

arate filaments, or "brins" as they are called, to cohere and form the single cocoon. As the single cocoon thread is far too delicate to be used by itself commercially, several of them have to be joined together in the reeling process, cohering in this case also by their gummy nature, and the resulting thread is the raw-silk of commerce.

If this raw-silk is intended to be put in shape for skein dyeing, or if several raw-silk ends are to be associated together so as to make a large bodied thread, it must be put through the process known as "throwing," which in its essentials is a doubling and twisting process, for, without the twist, the raw-silk ends, under the influence of boiling liquors, would open up their individual filaments and become matted, tangled and unworkable. The presence in the silk of the sericin, or gum, gives it a dull and lusterless appearance, and a harsh touch, and before it can acquire the brilliancy of appearance and the smoothness of touch which are the special characteristics of silk, this gum has to be removed by "boiling-off."

The amount of the gum that is present in the raw silks in general use, varies considerably, but would rarely be less than 15 or over 30 per cent. White silks have less gum than yellow silk, and most Asiatic silks are white, while most European silks are yellow.

The silks of North China, such as China-Steam Filatures and Tsatlees, are of a brilhant white color and quite lustrous. Canton silks from South China are very lustrous, but of a creamy or yellowish color, and, being made up of very fine cocoons, of which the filaments are most attenuated and break easily, are what is called "hairy." Japanese silks are generally of a good creamy white color, with fair luster.

From Eastern Europe and the extreme west of Asia, we have what are broadly classified as Broussia silks, or Levant silks, in which may be included those from Persia, Australia, Broussia, Adrianople, Syria and Greece, all being white or whitish. Some of the silks are described as green, or brown, because they have a tinge of such colors, but for all practical purposes they could be classed as white.

A large quantity of the cocoons raised in these districts are sent to Italy to be reeled, and are then often known as White Italians, but some of them are reeled in the districts they come from. The silks of Central and Western Europe are generally of a brilliant golden yellow. These are the silks of Piedmont, of Sicily, and of the other parts of Italy, the Spanish, the Hungarian, the Cevennes silks and others. Some white silk is also produced in Piedmont and elsewhere.

These various kinds of silks differ in their percentage of soluble gum, and consequently in their boil off, and this feature is of great importance to the knitter, as it will make a material difference in the weight and handle of his goods if the silk he is using loses 28 per cent. in the boil-off or only 18 per cent. The percentage of natural gum in the various silks will run about as follows: In Japan, from 16 to 20 per cent., with an average of 18; in Chinas, from 17 to 21 per cent., averaging 19; in Levant and Broussia silks, from 19 to 23 per cent., with an average of 21; in Cantons, from 20 to 24 per cent., averaging 22; and in yellow European, from 22 to 26 per cent., with an average of 24.

Occasional lots may run 2 or 3 per cent. above or below the limits mentioned, but these figures will include the great majority of the parcels. Another feature that has to be considered is the addition made to the weight of the silk by the use of soap and oil by the throwster, in the soaking bath which he gives to the silk as a preliminary to the throwing process. The weight of the material deposited on the fiber, according to the character of the bath given, will generally be from 2 to 5 per cent., and 3 per cent. may be taken as a fair average. The knitter, therefore, has to bear in mind that he may, in making his output from thrown silk, be using as the extremes in the scale, a Japan silk with a boil-off ranging from 16 per cent. gum, plus 2 per cent. soap and oil, total 18 per cent., to one with 20 per cent. gum, plus 5 per cent. soap and oil, total 25 per cent., or a yellow Italian silk with a boil-off ranging from 22 per cent. gum, plus 2 per cent. soap and oil, total 24 per cent., to one with 26 per cent. gum, plus 5 per cent. soap and oil, total 31 per cent., making a possible range of between 18 and 31 per cent. of boil-

off in the thrown silk that he might be paying for.

If, after throwing, the yarns have been tested to a sizing, or dressing, on the thread finishing machine, as is often done to make them smoother and enable them to be passed through the eyes and latches of the needles without fraying, this will introduce another soluble substance, representing a further addition of perhaps 2 to 5 per cent., which will have to be discharged in the boiling-off and which will cause a further loss in weight. If the amount of boil-off is a consideration, the knitter will do well to favor Japanese silks, and to exact proper guarantees from his throwster, or thrown-silk dealer, either as to the limits of soap and oil additions or as to the total boil-off after throwing. The natural color of silk, after the boiling-off, or discharge, of the gum, is usually a creamy white, and the yellow color in the yellow silk is a coloring of the sericine or gum only, not of the fibroin, and disappears with the gum when it is boiled off.

The object of the boiling-off process is to rid the silk of its gum, and to do it in such a way as will leave the silk as white, soft and glossy as possible, yet without disintegrating its component filaments, or causing the material to become hairy or matted. This boiling-off process is a fundamental treatment to which most silk, to be dyed in the skein, has to be subjected, and the principles of it are the same whether the silk to be degummed is skein silk, woven fabric, knitted fabric, or what not. We will therefore consider first the best dye-house practice in the treatment of skein-silk in boiling-off. An ordinary rectangular wooden vat is used, the sides of which are lined with canvas and the hanks of silk are suspended on wooden sticks as in dyeing. It is of importance that the soap used be of good quality, and nothing is better than a good, neutral, white, olive-oil or Marseilles soap.

The amount of soap to be used will vary with the percentage of gum in the silk and its hardness or softness. From 20 to 40 per cent. of the weight of the silk represents the range of the practice.

(To be continued.)

BASIC QUALITY OF SILK AND ITS TRUE VALUE

Read at the Philadelphia convention of the National Hosiery and Underwear Manufacturers Association, May 7.

By H. F. HOFFER, Paterson, N. J.

The Knitting trade is at this time consuming silk at the rate of 35,000 or 40,000 bales or about five million pounds per year, which is more than the total consumption of silk amounted to in the United States some 25 years ago and more than the total export of raw silk from Japan some 35 years ago.

The greatest part of this consumption has only been created during the last few years and particularly during the last two years.

While this growth of the consumption of silk in the Knitting Industry is indeed astonishing, the ease with which some of the manufacturers are handling a relatively new material, is little short of being wonderful.

Amongst the most prominent and most successful manufacturers in the various other branches of the silk business there are hardly any that have not fully realized a thorough knowledge of the raw material to be the foundation for ultimate and lasting success.

But contrary to what is the case with regard to the manufacturers in the other branches of the Silk Industry, silk is practically a new commodity for the Knitting manufacturers and his successful handling of same is therefore all the more significant.

At first glance and superficially looked at one might believe it to be necessary to take all sorts of chances in the handling of a material such as silk, which, in its raw state, is subject to a number of conditions apt to influence its value in very wide margins.

Such suppositions or false impression is in evidence even amongst the silk manufacturers of ever so many years' experience and practice. There are some ever so careful in the checking up of small monthly bills and passing for payment silk bills amounting to hundreds and thousands of dollars without any check of practical value whatever, arguing such check to be beyond their control and power.

The omission or neglect to properly check up silk bills for value received with regard to quality and quantity is in many instances not only detrimental to the buyer, but in very many instances even more harmful to the seller.

By far the greatest part of all the silk used in the Hosiery and Knitting trade is of Japanese origin and the Japan silks are known in this market under some such grading or classification as:

Double Extra
Grand Extra
Best Extra
Extra
Extra to Best No. 1
Best No. 1
No. 1
No. 1—1 1/2
No. 1 1/2

Unfortunately many users of silk are under the mistaken idea any number of lots of silk of a like

description to be of one uniform quality, ready to accuse the seller of unfairness and unreliability in case of reverse results.

True enough any two silk inspectors on any of the original markets may be of a different idea regarding the quality of a certain lot of silk and what the one might consider to be say Best No. 1, the other might consider to be good enough to pass for Extra.

But it is not so much from such difference of opinion that so many lots of silk bring disappointment in the course of manufacturing, than from the fact that the present method of grading and classifying silk is incorrectly interpreted. Two lots, even when inspected by the same inspector and found to be of an identical average grade may bring very unlike results.

The explanation for such condition, gentlemen, is very simple.

If the pupils in our schools were classified or rated with regard to their efficiency on the same basis as silk is classified, from Grand Extra down to No. 1 1/2, we might find a number in the same class deserving the grade "Extra," yet no two of them might be of the same efficiency with regard to the particular subject "arithmetic."

We are all acquainted with the method pursued in the rating or grading of the pupils in our schools and we all know that the mark of "100" means the highest degree of efficiency, any lower mark meaning a proportionately lesser degree of efficiency.

The report of two scholars might run as follows with regard to

	Scholar A	B
Arithmetic	100	80
Geography	95	85
History	90	90
Reading	85	95
Writing	80	100

Both averaging 90.

Yet to be sure, if we were to choose between the two for any such purpose where "arithmetic" is essential we would certainly call on Scholar "A" with his mark of efficiency "100" in this particular subject and vice versa would we prefer "B" if we were looking for a good penman.

This logic, gentlemen, applies or should be applied for the determining of the value of silk with regard to its basic quality.

Instead of dealing with "arithmetic, geography, etc.," we must ascertain the efficiency of silk with regard to:

evenness of the thread
elasticity
strength
cleanness
nature

and we may use the norm "100" for the maximum efficiency in the various subjects, after having agreed upon what to consider the maximum efficiency.

Unfortunately no standard has ever been established with regard to raw silk, but from experience we know that:

A raw silk varying not more than 3 deniers in the single filament when tested at the rate of 30 lengths of 450 meters is the best result that we can expect and we may therefore consider a discrepancy of not more than 3 deniers the maximum efficiency for evenness and call this "100." This as a basis would at once give a

variation of 4 deniers the parity of "75"
variation of 5 deniers the parity of "60"
and a variation of 6 deniers the parity of "50"
etc.

A silk allowing a stretching to 25 per cent. of its length we know from experience to be as good a silk as we have a right to expect and we may therefore consider a stretching capacity to 25 per cent. as the maximum efficiency for elasticity.

This as a basis and called "100" would indicate a

stretching capacity to 20 per cent. to be the parity of "80"
stretching capacity to 15 per cent. to be the parity of "60"
stretching capacity to 12½ per cent. to be the parity of "50"
etc.

A silk breaking under a pressure of not less than the weight of 36,000 meters we know to be the best possible result to be expected with regard to strength. Accidentally 36,000 meters of any kind of silk represents in weight four times as many grammes as the respective size in deniers. From this results that a silk of 15 deniers average size should stand a pressure of 4 x 15 equals 60 grammes, other sizes in proportion. (14 den.—4 x 14: 56).

For a silk of 14 deniers average size we therefore expect a breaking under no less than 56 grammes and calling 56 grammes as the maximum efficiency or "100" we at once arrive at the conclusion that the breaking

at 50 grammes would be the parity of "90"
at 45 grammes would be the parity of "80"
etc.

Cleanness of silk is a subject that we may compare with the subject of "reading" for which the teacher in school has to go by judgment and experience or by comparisons. While no absolute basis can be established in this respect, it takes very little practice or experience to ascertain to a reliable degree the efficiency in this subject, especially so when resorting to the practice of reeling some silk onto a black card or black reel as is being done by the careful manufacturer in the Ribbon and Broad Silk Branches.

The degree of silkiness or nature again is judged by the majority of people on strength of their experience and may be compared with the subject "writing," but in absence of any accurate basis we may resort to the rule that amongst the Japan silks the best grades are found amongst the silk losing least in the boiling off operation and vice versa. A loss in boil off of not more than 16 per cent. is a very low boil off and as a rule stands for a very good basic stock, whereas a silk boiling off as much as 20 per cent. in the raw denotes a silk of poor basic stock. Going by this rule we might call 16 per cent. boil off as the maximum efficiency with regard to nature and with this figure as a basis we would at once recognize a silk boiling off

18 per cent. as the parity of "90"
20 per cent. as the parity of "80"

Proceeding along such rules as a basis it is a sinecure even for a layman to accurately ascertain the true quality of any lot of silk.

Supposing a lot of silk under examination should show:

an average size of 14.50 deniers
discrepancy in size from 12 to 16—4 deniers
elasticity, 18 per cent.
tenacity, 54 grammes
boil off, 18.50 per cent.

and supposed we should find the cleanness to represent 80 per cent. of the maximum, we would find such lot to be of an efficiency of

75 for evenness
80 for elasticity
91 for tenacity
80 for cleanness
88 for nature

Total 414: 5—average 82.8 or round 83.

Such tests and results are giving a clear picture of the actual quality of the silk, contrary to the questionable meaning of the terms Extra or Best No. 1, etc.

The table here displayed

Lot	A	B	C	D	E	F
Evenness	60	75	85	75	85	85
Elasticity	80	80	80	85	75	90
Strength	100	94	88	100	98	95
Cleanness	80	90	75	80	82	75
Nature	94	75	86	98	98	93
Total	414	414	414	438	438	438
Average	83	83	83	88	88	88

shows 6 lots of silk classified or graded on basis of the above rules. The first 3 lots are of identical quality on an average of what might be called "Extra" under the present understanding of classification, whereas the last 3 lots, also identical in quality, might represent silk of the grade of "Double Extra" under the present understanding of classification.

Looking over the table the discriminating hosiery manufacturer would undoubtedly decide in favor of lot C if he were to buy any of the lots from A to C because that lot seems to have the highest efficiency with regard to evenness and evenness is what he is particularly anxious to secure. The table, however, will show something more interesting yet. If under such name as best No. 1 or Extra the manufacturer should have struck a lot of silk such as represented in the table as lot A he might come to the conclusion that silk of Best No. 1 or Extra grade is not good enough for his purpose because that particular lot has been exceedingly poor with regard to evenness and consequently he might with an additional expense of from 10 to 20 cents a pound, switch over to a higher grade, say Double Extra and while perhaps better satisfied than with the silk of the Best No. 1 or Extra grade he might wonder why his competitor is able to get along on the Extra grade which has been a failure in his instance. How about it is such competitors should have selected from among a number of lots of the lower grade such ones as are represented in lot C of the table? Lot C with regard to evenness would even give better results than lot D of the higher priced series because in the particular subject of evenness the lot C of the lower grade is bettetr than lot D of the higher grade series.

As a hatband manufacturer I would unquestionably give lot A the preference over lots B and C because for successful hatband manufacturing the efficiency of strength is first consideration.

But as a broad silk manufacturer, and especially if to be used for satin in the warp, I would give lot B the preference over A and C because it is the cleanest of the three lots and for that purpose cleanness of the thread is first consideration.

In ignorance of the conditions of the silk in the individual subjects a silk fully up to grade may be used for an altogether unfit purpose and the dealer or seller of such lot of silk may unjustly be blamed for the non-success, the only cause for the failure of the material to show to best advantage being that it was omitted to subject same to the proper tests.

This much what the conditions in raw silk are concerned.

Queer as it may appear at first glance, the ascertaining of the basic quality of raw silk, that means silk in the single filament, is no positive safeguard for the manufacturer that uses silk in the thrown state, because thrown silk is as much a different material from raw silk as a finished stocking is a different material from thrown silk.

True enough, it requires a good material of raw stock to insure a good material in thrown state, but even the best material in the raw state can, by improper handling, be converted into a relatively poor material in the thrown state.

In the Ribbon and Broad silk end of the Silk business the manufacturers used to buy their raw material almost exclusively in the single thread, having it made up into the required number of filaments by what is commonly called Commission Throwsters.

The last few years have brought a considerable change. The manufacturers are beginning to realize that a good silk in the thrown state is a guarantee for successful manufacturing, whereas a good silk in the single thread is a question mark with regard to its behavior in the manufacturing process after the throwing.

In olden times people used to buy a piece of goods to have a suit made out of it by what may be called commission tailor and those were the glorious times for the tailor as well as for the merchant, because a bad fit of the suit was attributed by the tailor to the unsuitability of the goods and the merchant on the other end called the tailor a shoemaker or something of the kind, but at any rate the suit may have been spoiled and the wearer disgusted. Today we have the merchant tailor make our suits and if the fit is unsatisfactory we hold him responsible, irrespective of whether the goods or the workmanship be at fault, the one party furnishing both.

Before long the manufacturers in general will have overcome the last obstacle for following up the merchant tailor's theory.

It is only a question of time when it will be generally realized that there are sufficient condi-

tioning and testing facilities at our command to take care of all the necessary testing to be done for the proper ascertaining of true value of silk not only with regard to quality, but quantity as well.

When silk first came to this country from Italy and Japan, it was in such relatively poor condition with regard to its working qualities that it was troublesome for the throwster to handle it, especially with regard to the winding.

The saturating of the silk with some such ingredients as oil combined with soap, glycerine, vaseline, salt, etc., proved to be of welcome assistance in the winding of the silk from skeins to spools, to such an extent that the practice of adulterating of the silk in this manner became general and being that the application of such solution or adulteration did not only improve the working qualities of the silk, but was a means of increasing the weight, the practice soon became excessive.

The quality of the silk from Japan and Italy gradually improved with regard to the working qualities in throwing until it finally reached that stage of perfection that the application of said soaking device became practically unnecessary, but it was kept up nevertheless on account of the advantage of the increased weight.

The manufacturers aware of this condition and unwilling to take the chances of paying a good silk price for a worthless portion of oil and soap, etc., preferred to secure their raw material in the unadulterated raw state of single thread, taking the oil and soap added in the throwing process as additional weight, but not as silk, which accounts for the fact that for every 105 pounds of silk sent to the throwster they received as much as 10 or more pounds of weight back.

At that time the Conditioning House was not in a position to take care of more than a small portion of the total quantity of silk that should have been subjected to scientific tests, but today nobody needs to keep on guessing and taking chances.

Today the U. S. Conditioning and Testing Co., the official testing institution for the Silk Associations of America, is in a position to furnish tests enabling any party of any transaction for which a basis has been agreed upon to determine by fractions of a cent, if necessary, the value received for either quality or quantity.

According to the standard for conditioning of silk not every 16 ounces of weight constitute 16 ounces of silk, only when in the proper condition do 16 ounces stand for one pound.

A price for silk only then becomes to be a certain price when an understanding is arrived at as to what portion of water is tolerated in a certain weight, what portion of boiling off matter is tolerated in a certain weight and as to what length there should be contained in a certain weight.

Any lot of silk, deviating in its actual condition ever so much from the condition stipulated for the transaction, is by the respective tests reduced to the stipulated condition. If a parcel of silk called 105 pounds, only represents a value of 100 pounds, the test of the Conditioning House will and must disclose.

With such accurate means at our command to check value received, the silk trade at large is beginning to take advantage of the convenience embodied in the method of "buying the suit of cloth from the merchant tailor."

Some years ago a method was introduced in the market bringing the commission throwing of silk to a basis which made it impossible for the manufacturers to be in the uncertain as to the ultimate cost for the throwing because in order to make the method effective the manufacturer was compelled to make the necessary tests which are indispensable for a proper checking up of the returns and without which the returns can be manipulated at will and misrepresented without detection or positive proof.

That method is called "100 per cent." basis for clearances and has been severely attacked for a long time and unfavorably criticised by elements preferring to do business on a guess basis. But we may well fasten a barrel of oil at the bottom of the ocean, no matter by what means, the oil is bound to float. The barrel itself will give way or the rope or the chain with which it is fastened, it is all a matter of time. And so the 100 per cent. method of clearing lots has gradually worked its way to the surface until it has finally been recommended as the safest method for the handling of the commission throwing business of the U. S. Conditioning House under the auspices of the Silk Association of America, as the pamphlets of the Conditioning House, ready for distribution, will best prove.

In line with these principles, the manufacturers will ultimately realize that when their purchases of thrown silk are subject to the "100 per cent. basis for the dealing in thrown silk" they can make absolutely sure of the cost of their material by the fraction of a cent be the quantity ever so large.

That method has as basis an absolute understanding between buyer and seller with regard to moisture, fiber and length content to a certain unit of weight, any deviation or discrepancy from such understanding being automatically adjusted. The method is clearly demonstrated in a little pamphlet ready for distribution.

The application of this method will not only do away with the many deplorable conditions existing between buyer and seller, but will be a welcome improvement in the conditions existing between manufacturer and the dyer, because the method applied will remove all and every temptation for adulteration of the material.

In many instances has the adulterated condition of the silk played havoc with the dyer and been the cause of many severe losses for dyer and manufacturer, losses that might as well have been prevented.

The basic quality of silk in the thrown state is ascertained in the same manner as illustrated for the raw silk.

Terminating I wish to say that if any of the points referred to should need further explanation it shall be a pleasure for me to answer any call at any time.

Also do I wish for everybody a continuance of good luck and prosperity and may the Knitting trade grow to be the greatest factor in the Silk Industry.

Dyeing, Bleaching, Finishing, Etc.

MILL EXPERIENCES

Under this head we will publish from time to time stories from practical mill men, telling of vexatious and unusual difficulties which have occurred in different branches of mill work, and how they have overcome them. We invite mill men to send us an account of such experiences. We pay of course for all that we use. Facts told just as you would tell the story to a friend are what we want, not fancy writing.

TWENTY-FOUR YEARS IN THE BLEACHING AND FINISHING TRADE

BY DELCO

When a man looks back at the past it is surprising how quickly the years seem to have passed. When one gets a foreman's position it is with a feeling of awe and wonderment as to how he will come out of the ordeal, what kind of satisfaction shall he give, whether he will be able to hold it down, to get along with the men and give satisfaction to his superiors. I will relate an experience that befell a foreman that I know, when I was aspiring with all the ambitions of youth to become one also. It printed itself upon my mind and I have always remembered it. In the year 1890 when I was employed in a small bleachery in the north of England, we were working on light goods, mostly for the East, China and Japan. The bleacher was a first-class man. We also had a good finisher, but something went wrong with the finish on the goods and he had left. A new man came to take the position, a man with a reputation, having had experience at home and abroad. We had been finishing some lanjibs for Egypt and under the old boss had been running them through a strong solution of epsom salts. The new boss also put them through a solution of epsom salts, but not such a strong one. I drew the finisher's attention to the fact that the solution was too weak for the goods, but he took no notice of the suggestion. This gave me my first lesson, "Mind your own business." However, we finished the lot, they were dried and finished off, and when they got into the finishing room the goods were too light. They were sent back to the finishing room and the finisher thought he could make them come up to the standard weight. They were put through a solution of chloride of zinc in the mangle and were finished off. The weight was found to be correct and they were packed and shipped to the warehouse at Manchester. Here a case was opened up to see if the goods were all right before being shipped to the custom house. The goods seemed to be covered with a frost. This was due to passing the goods through the salts first and then refinishing with the chloride of zinc, as it had not penetrated into the cotton. A reaction had set in when the goods were cased up and the zinc could be shaken off like so much dust. The goods, of course, were rejected and although the finisher did not lose his position immediately, he did not last very long. This experience taught me a lesson, that is to mind my own business, never to be afraid to follow suggestions that were offered by men who were working under me, and never to think that I knew it all.

I now come to my first position as foreman. I could see that I was not lying on a bed of roses, as it was quite an undertaking to have some 70 hands under me. When a man takes hold of a new position, he has a certain amount of prejudice to overcome, both as regards the masters and the men. On the masters' side, it is a question as to your capability. Are you as good a man as the other one we had? Can you get out the work? Can you give us the finishes we are after? Can you handle the men? These are a few of the questions that force themselves upon a new overseer. On the man's side, it is a question whether he should use the methods he has previously followed, and be able to get the same work out of us? The position in question was that of a second hand. The superintendent was a good man, but I had to handle the men and get the work out

under his instructions. This was where I got my training. Here was where I found out what the men would do with a new boss, especially if a man did not fully understand the handling of help. For a short time everything seemed to be going smoothly, the boys behaved well and I thought I had the job well in hand. One day, however, they commenced their tricks. I presume it was to see if I was capable or not, or if I could handle them and get out the work. In the first place the man on the sprinkler ran some goods through without water, and when they got to the stretcher the man could not stretch them to the required width without damaging them. I examined the machine, gauged the front and back, but everything seemed to be all right. I measured the goods, and they were as usual before the stretching. I went to the grey room to find out if there was anything wrong in the grey, but everything seemed to be all right until they came to the sprinkler. I got the man to run another batch of goods and stayed right by the machine, and it went through all right. I had the other rolls redampened and the man who ran this machine received instructions that if this same thing occurred again we should part company.

The next trouble I experienced was on the dryers. We had four sets and each set of dryers had a separate engine. On this particular set we had some goods that were very hard to run and I could see the men did not take kindly to them. They had not been running very long before they called me to the dryers as they could not get them started up. They had stopped to load and unload their truck and could not get the dryers started. I made a close inspection of the engine, but it appeared to be all right. I then examined the gears and found a four-inch bolt placed in between the driver and the driven. I called the men together, but no one would acknowledge it. After considering the matter I came to the conclusion it had been placed there in malice, so I discharged both the men to make sure I was getting the right one. After this I had no further trouble with the men.

Next came my first position as a superintendent. I took full charge of the bleaching and finishing and was general superintendent of the plant. It is in this position that I had many prejudices to overcome. Before I had become acquainted with the running of the plant, a batch of samples was submitted from headquarters. These had to be matched in finish and feel and patterns submitted of the goods we were at that time handling. I finished a range of samples to match those sent in. No end of fault was found with them. They are not as good as we have had; the pattern shows too much filling; the pattern is not bright enough; this is too firm; this too soft, etc. I arranged to do another set of samples, one long piece of each kind to match the samples in the different finishes. When I had completed them and they had been sent to the folding room, I had each piece cut in two, marking one-half, finish No. 1, and the other, finish No. 2. These samples I did not submit, but called the head salesman down to the works to either adopt or reject them. As we went over the samples he would have some reflection to cast, invariably on the No. 1 samples, but the No. 2 samples were much nicer, and he finally adopted these samples for the season's trade. If this did not prove prejudice against the class of finish which I produced, I do not know what to call it. I could not call it ignorance, as the man had held the position as head salesman for a number of years, and could, or should have been able to tell a finish or the feel of a piece of goods as soon as he got it between his fingers and thumb.

I held this position for a few years giving entire satisfaction. Then I was offered another position with a large corporation and had several years of ordinary troubles which occur with every man who holds a responsible position in the bleaching and finishing business. This corporation had several plants in different places. New men had got control and drastic changes had to be made. They decided to close down their small plants and concentrate all into one large plant. An expert mechanic was engaged, an expert bleacher and finisher at an exorbitant salary were required to organize the plant. While the plant was being organized

the bleacher would come down to find out details in regard to how we did the work, at what speed the machines were running and a lot of other necessary information that is always required in starting up a new plant. I gave him all the information I could, but at the same time I felt quite put out to think that an expert should have to come and get details from me, as I had been informed, unofficially, that I was not to get the position when the new plant was organized. I had a long talk with the manager who informed me that the position was secure. The new plant was at last ready, but when they started up the expert proved to be a failure. He could not get out the production, could not match the finishes that were required, so he was let go. Another first-class man was obtained, also classed as an expert. He condemned the plant as being out of date; without being engaged he was paid a lump sum to investigate, go over the plant, offer suggestions and report as to what improvements he would make. This was to be done with a promise of the position if the report was favorable. He brought out a few samples which did not turn out right, so he was not engaged.

Then I was ordered to take charge, pro tem, which I did, with the expectation of being given a chance to make good, which, however, did not materialize. Another man was obtained, he was under contract also, and he stayed six months with no better results. Before the plant had been in operation two years they reported a loss of $80,000, which could have been avoided if the plant had been organized in a proper manner. During my twenty years' experience, I have seen many repetitions of this experience. After being treated in such a shabby manner after several years' service, I could do nothing but tender my resignation. During this time I have seen many changes, from the old lime bleach in the open kier, which took four or five days, to the improved kiers of the present time which can turn out goods in from ten to fifteen hours' boiling. The same applies to the finishing. With improved machines the modern finisher has many advantages compared with the conditions a quarter of a century ago.

LISTED PIECES

By P. F. CROSLAND, B. Sc.

Before the Huddersfield Textile Society

(Continued from March.)

Another curious unevenness in scouring is that produced indirectly by the use of ammonia. Ammonia is a most excellent scouring agent. It is searching but does not injure the material. It is especially beneficial for dissolving soap. But it happens that ammonia has an energetic action on copper, dissolving it rapidly to form a blue solution which stains cloth a dirty brick red. If the goods are afterwards dyed, since copper has a marked attraction for dyestuffs, these stains are very apt to come up blackish in color. Ammonia, therefore, should not be used in scouring machines having brass or copper sheathed rollers, nor in milling machines which have any brass parts. This warning applies with especial force when the goods are to be dyed in a light shade. There is no method of curing these stains when they have once appeared, though they can be partially removed by treating them at once with a cold one per cent. solution of hydrochloric acid, followed by a thorough washing.

Listed pieces too are often produced by the incomplete removal of the size which is often applied to worsted warps, to reduce friction in weaving. Generally speaking, these sizes are composed of animal gelatine prepared from bone and the like. Although very strong solutions of gelatine can be prepared, it is by no means easily dissolved, exposure to water being necessary to soften and swell the material before dissolving it. So, in the case of worsteds containing sized warps, the ordinary scouring process in many cases only serves to soften and partly dissolve the size. This when the pieces are left standing settles to the list and remains there. When the material is eventually dyed the gelatine, which chemically speaking resembles wool very much, absorbs the dye, and dark lists result.

The milling process, so far as my experience goes, is not liable to produce listed pieces if the cloth leaves the loom right, and

if the workman in charge of the machine sees to it that the pieces do not run too long in the same folds.

It is, however, much different with pieces which are crabbed and blown, for an inefficient performance of either of these operations will inevitably result in a listed effect on dyeing. If, for example, the goods are badly crabbed, the steam during the subsequent blowing endeavors to force its way between the folds of cloth towards the selvages, and in doing so, drives any grease or lime soaps in the cloth before it, causing them to accumulate in the lists to produce an unsightly effect on dyeing.

Blown goods are very liable to show cloudy lists, especially at the lower end unless the steam is blown through the whole length of the roll. Listed effects can also be produced, especially when vertical blowers are used, by the slipping of the cloth in the rolled state. Slack winding is usually the cause, but some soft and heavy fabrics cannot support their own weight when the steam enters. This slipping causes the formation of large glazed creases near the bottom of the roll. It is nearly hopeless to try to mend this fault once it appears. The best plan is to carefully rewind the cloth while hot on to another roll and then repeat the blowing.

The same defect occurs occasionally in the roll-boiling of pieces. There are several other precautions which must be taken to prevent listing during the process of roll-boiling faced fabrics. The best rollers to use are old copper blowing rollers as they allow free access of the water to the middle of the roll, and also sink better than the ordinary wooden rollers, which were, and still are, often used. Following boiling, it is advisable to cool the rolls overnight before pulling off, and they should be set upright against a wall with only the roller ends touching the wall and floor. For the first few hours it is advisable to reverse the rolls or listing may ensue from the draining of the dirty liquor to one end. Even with the greatest care a listed appearance will occasionally be produced. This can be removed by a gentle rinsing with cold water, but if this precaution is neglected, the defect may be rendered more permanent during subsequent processes.

We come now to listed effects produced by mordanting and dyeing. To begin with, there are quite a number of mechanical defects which readily produce bad lists. If, for example, the pieces are too wide for the vessel and the pieces rub against the sides, this effect will probably be produced, while, if the vessel is copper-lined and the material is being dyed with an aniline dyestuff, the probability becomes a certainty. The prevention of this defect is obvious enough. Another cause more difficult to remedy arises from the fact that when a piece is being dyed at full width on a winch machine, the edges of the piece, as soon as it has left the liquor to travel over the winch, cool quicker than the middle, so that the edges are dyed at a lower temperature than the middle of the piece, producing light lists. There is no certain preventative of this, but the best thing to do is choose dyestuffs which are not much affected in their attraction for the fiber by slight changes of temperature.

The reverse effect, darker lists, have been known to be produced by working with too little liquor in the bottom of the machine.

If a number of pieces are piled down as in a winch machine it will be found invariably that the shape of the roll produced is crescent-like with the two lists lowered down. If there is a deficit of dye liquor the lists of the pieces will be immersed in hot dye liquor, while the middle will be raised high and dry above it. If a listed piece has been produced in this way the effect will be a dark broad list suddenly shading off towards the middle.

The steam coil, it matters not whether it is open or closed, should be shut off from the main part of the vat by a perforated partition, and the entering steam pipe should be led up one corner of the vat and boxed off so as to prevent the hot pipe coming in contact with the material which is being dyed, as such contact may cause dark lists. Particular care should be taken when the dye liquor is heated by blowing in live steam, that too large a quantity of cloth is not en-

tered into the machine at once or there is a danger of some parts of it remaining for quite a long time, piled up against the perforated partition, shutting off the steam pipe from the vat. This partition is in a constant state of vibration, and cloth subjected to it while immersed in the boiling dye liquor takes on a crinkled appearance which cannot be permanently corrected even by pressing. This defect is made worse if the screen is broken and the material is exposed to the vibration of the screen, the action of the boiling liquor and the inrush of live steam at one and the same time.

Goods after either mordanting or dyeing should not be allowed to remain plaited down in the damp state for any length of time, even if they have been thoroughly washed, or they will dry at the edges and very often show a listed effect. This applies particularly to goods which have been freshly mordanted with chromium, for chromium salts, as any expert photographer knows, are very rapidly acted on by light in the presence of such substances as the wool fiber is composed of, and as a result, the selvages come up darker on dyeing.

A DYEING MACHINE

The dyeing machine shown in the illustrations is designed for coloring hosiery, the object being to provide a machine in which the dye liquor will be distributed evenly throughout the goods and a uniform color thus obtained. Special facilities are provided for handling the stockings, both in loading the machine and removing the goods after dyeing. Fig. 1 is a side elevation of

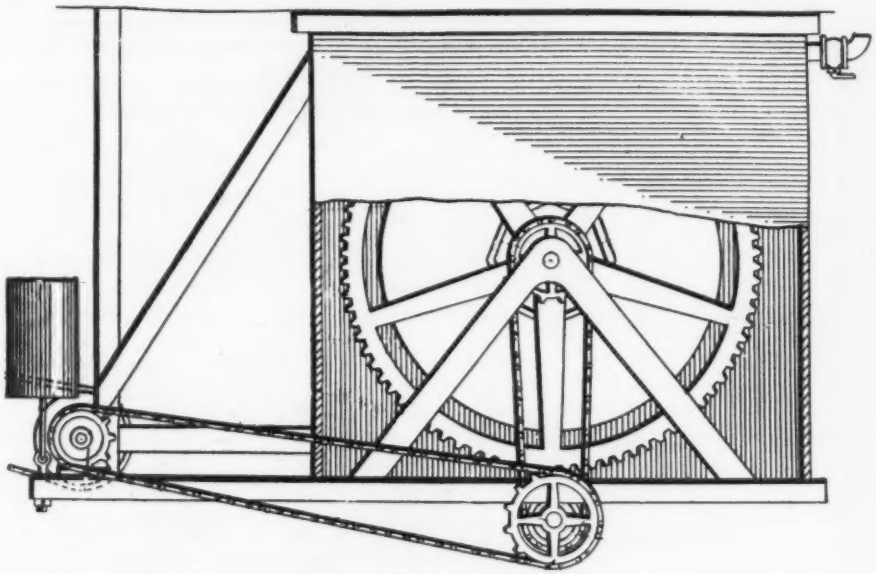

FIG. 1

the improved machine. Fig. 2 is a plan view partly broken away. To one end of the tank a frame is secured and supports a shaft. A top is provided to close the tank and has perforated ears to receive the shaft and act as a hinge. The top is provided with hangers within the tank which support a shaft on which the improved drum is mounted. The drum is made cylindrical, having an octagonal longitudinal center and a circular series of radially disposed partitions connecting the center with the cylindrical drum and forming a circular series of compartments. The octagonal center is provided with spiders which are made with central sleeves mounted to turn on a shaft.

The center, the partitions and the circular drum are all perforated, while the ends of the drum are solid, and effectually close all of the compartments at their ends, but do not close the ends of the octagonal center, permitting the dye to flow freely into this center and be deflected radially through the compartments by means of radially disposed stirrers. These stirrers or agitators are in the general shape of a shovel or scoop, and are connected by rods with shaft. It will be noted that these stirrers are arranged in circular series around the shaft. As the shaft revolves these stirrers throw the dye radially and compel it to pass through the compartments.

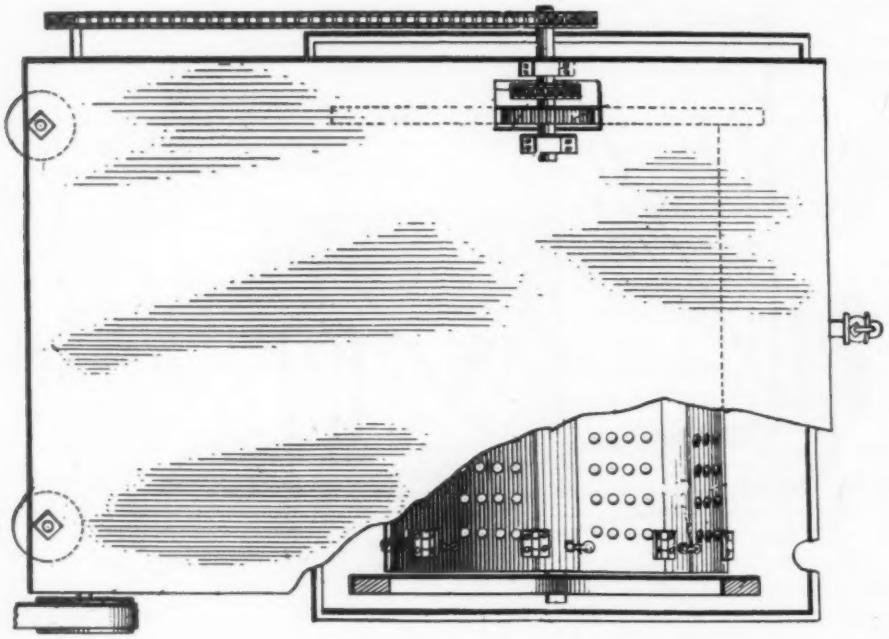

FIG. 2.

The drive shaft is provided with a pulley to which motion is transmitted by means of a belt from any suitable source. On this shaft a sprocket wheel is secured, and is connected by a sprocket chain with a sprocket wheel on a shaft. This shaft is supported in bearings on top, and the top below the shaft is provided with an opening. Over this opening on the shaft a sprocket wheel and a pinion are secured. The sprocket wheel is connected by a chain with a sprocket wheel secured to shaft, while the pinion meshes with a large gear secured to one end of the drum. It will thus be seen that motion is transmitted through the pinion to turn the drum slowly in one direction, while the shaft is rapidly revolved in the other direction. This shaft which carries the stirrer constitutes an agitator, causing the dye to be thrown out radially through the several compartments, while the latter are moving in a circular direction and a uniform distribution of the dye is assured.

Each of the compartments is provided with a hinged gate held by securing devices. These gates are opened and closed as the stockings or other articles are inserted and removed from the compartments. During this operation of inserting or removing the articles, the top is thrown up the shaft, constituting a hinge pin. To facilitate this movement and balance the weight of the parts, counterweights are connected to the top, where it projects beyond the shaft, and

these weights assist in balancing the apparatus and enabling the drum to be readily moved into and out of tank.

Dye Recipes

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD RECORD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16-page pamphlet, in convenient form for preservation. Subscription price for the Dyers' Supplement $1.00 per year.

Recipe No. 81

ORANGE ON COTTON YARN

Para Brilliant Orange G on 100 lbs. cotton yarn. Prepare the dye bath with

4 lbs. Para Brilliant Orange G.
(Farbenfabriken Co., 117 Hudson St., New York, N. Y.)
25 lbs. Common Salt.

Enter at 180° F., and dye at a boil for one hour. Then rinse in cold water, and couple with paranitraniline in a cold bath made up as follows:

1 lb. Para Nitraniline.
2¼ lbs. Hydrochloric Acid Conc.
2 gals. Water.

When the hydrochloric acid has thoroughly reacted with the para nitraniline this mixture is stirred well with

4 gals. of Water,

and when thoroughly cold

¾ lb. Sodium Nitrite

previously dissolved in cold water is added.

When ready for use add

¼ lb. Sodium Acetate,
½ lb. Sodium Carbonate,

dissolved in water.

Para Brilliant Orange G possesses a brightness of shade which exceeds that of other similar coupling colors. It possesses good fastness to washing and also discharges well with Rongalite C.

Recipe No. 82

YELLOW ON WORSTED YARN

Milling Yellow No. 85 on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Milling Yellow No. 85.
(F. E. Atteaux & Co., 174 Purchase St., Boston, Mass.)
10 lbs. Acetic Acid.

Enter at 120° F., and dye at a boil for one hour. Then after-chrome in a fresh bath made up with

3 lbs. Potassium Bichromate.

Milling Yellow No. 85 can also be dyed with chrome in the bath, and is especially useful in the dyeing of wool material containing white silk thread illuminations.

Recipe No. 83

BLUE ON COTTON YARN

Sulphur Blue P R on 100 lbs. cotton yarn. Prepare the dye bath with

10 lbs. Sulphur Blue P R.
(Berlin Aniline Works, 213 Water St., New York, N. Y.)
10 lbs. Sodium Sulphide.
5 lbs. Soda Ash.
50 lbs. Glauber's Salt.

First add the soda ash, bringing the bath to dyeing temperature of 200° F., then add the dyestuff already dissolved in sodium sulphide, and finally add the Glauber's Salt, which has been previously dissolved. The material is then dyed for one hour at 200° F. Only 7 per cent. of dyestuff is required to produce this shade in a standing bath.

Sulphur Blue P R possesses good fastness to light and weather, alkalies, washing, and acid, and will be found useful for the production of very dark blue shades.

Recipe No. 84

BROWN ON WORSTED YARN

Chrome Brown M No. 264 on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Chrome Brown M No. 264.
(F. E. Atteaux & Co., 174 Purchase St., Boston, Mass.)
10 lbs. Acetic Acid.

Enter at 120° F., and dye at a boil for one hour. Then after-chrome in a fresh bath made up with

3 lbs. Potassium Bichromate.

Chrome Brown M can also be dyed with chrome in the bath, and is especially useful in the dyeing of wool material containing white silk thread illuminations.

Recipe No. 85

BROWN ON WORSTED CLOTH CONTAINING WHITE SILK ILLUMINATION

Naphtalizarine Brown S on 100 lbs. worsted cloth containing white silk illuminations. Prepare

the dye bath with

4 lbs. Naphtalizarine Brown S.
(C. Bischoff & Co., 451 Washington St., New York, N. Y.)
1½ lbs. Potassium Bichromate.
8 lbs. Ammonium Acetate.

During the dyeing, two portions of 4 lbs. each of acetic acid are added.

Enter at 120° F., and dye at a boil for 1 1/2 hours.

Naphtalizarine Brown S is particularly useful in the dyeing of material containing white silk illumination threads, leaving them unstained. It also possesses excellent fastness to light.

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Recipe No. 86

BROWN ON WORSTED CLOTH CONTAINING WHITE SILK ILLUMINATION

Naphtalizarine Brown S on 100 lbs. worsted cloth containing white silk illuminations. Prepare the dye bath with

4 lbs. Naphtalizarine Brown S.
(C. Bischoff & Co., 451 Washington St., New York, N. Y.)
8 lbs. Ammonium Acetate.

Enter at 120° F., and dye at a boil for one hour. During the dyeing two portions of 4 lbs. each of acetic acid are added.

After dyeing is completed after-treat in separate bath with

2 lbs. Potassium Bichromate.
5 lbs. Acetic Acid.

Naphtalizarine Brown S is particularly useful in the dyeing of material containing white silk illumination threads as it leaves them unstained. It also possesses excellent fastness to light.

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Recipe No. 87

SCARLET ON COTTON YARN

Diamine Azo Scarlet 6 B L Extra on 100 lbs. cotton yarn. Prepare the dye bath with

4 lbs. Diamine Azo Scarlet 6 B L Extra.
(Cassella Color Co., 182 Front St., New York, N. Y.)
20 lbs. Glauber's Salt.

Dye at a boil for one hour, then diazotize by working for 15 minutes in a bath made up with

3 lbs. Sodium Nitrite
7½ lbs. Hydrochloric Acid 32° Tw.

Then develop in a separate bath made up with

1 lb. Beta Naphthol,
1 lb. Caustic Soda.

and the necessary amount of water.

Diamine Azo Scarlet 6 B L Extra possesses very good fastness to acids and washing, and will be found an excellent red for all ordinary purposes.

Recipe No. 88

VIOLET ON COTTON YARN

Diamine Fast Violet B B N on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Diamine Fast Violet B B N.
(Cassella Color Co., 182 Front St., New York, N. Y.)
½ lb. Soda Ash.
20 lbs. Glauber's Salt.

Dye at a boil for one hour.

Diamine Fast Violet B B N possesses excellent fastness to light and is well suited for the dyeing of half wool and half silk material, as well as for straight cotton material.

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Recipe No. 89

BLUE ON WORSTED YARN

Amido Blue B on 100 lbs. worsted yarn. Prepare the dye bath with

5 lbs. Amido Blue B.
(H. A. Metz & Co., 122 Hudson St., New York, N. Y.)
5 lbs. Sulphuric Acid.
20 lbs. Glauber's Salt.

Enter at 150° F., and dye at a boil for one hour.

Amido Blue B is recommended for ladies' worsted and woolen goods, also for men's light wear material. It does not stain white cotton effect threads.

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Recipe No. 90

BROWN ON WORSTED YARN

Oxy Chrome Brown G R OO on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Oxy Chrome Brown G R OO.
(Geisenheimer & Co., 189 Front St., New York, N. Y.)
5 lbs. Acetic Acid.
15 lbs. Glauber's Salt.

Enter at 120° F., and dye at a boil for 3/4 of an hour. Then add

2 lbs. Sulphuric Acid

and boil for 1/2 hour longer.

Then after-Chrome at a boil for 3/4 of an hour in a separate bath made up with

3 lbs. Potassium Bichromate.

Oxy Chrome Brown G R OO possesses very good fastness and will be found an excellent color for the dyeing of compound shades.

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Recipe No. 91

BLACK ON COTTON YARN

Oxamine Black B B on 100 lbs. cotton yarn. Prepare the dye bath with

8 lbs. Oxamine Black B B.
(Badische Co., 86 Federal St., Boston, Mass.)
30 lbs. Common Salt.
2 lbs. Soda Ash.

Dye at a boil for 3/4 of an hour, and then allow to remain for 1/4 hour in the cooling bath.

Then diazotize in a cold bath made up with

3 lbs. Sodium Nitrite.
7½ lbs. Hydrochloric Acid 32° Tw.

Then develop in a bath containing

1 lb. Developer H Conc.
2 lbs. Soda Ash.

Oxamine Black B B produces an excellent shade of black for purposes where a direct cotton color is required.

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Recipe No. 92

VIOLET BLUE ON WORSTED YARN

Chromegene V O on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Chromegene V O.
(Geisenheimer & Co., 189 Front St., New York, N. Y.)
5 lbs. Acetic Acid.
15 lbs. Glauber's Salt.

Enter at 120° F., and dye at a boil for 3/4 of an hour. Then add

2 lbs. Sulphuric Acid

and continue the boiling for 1/2 hour.

Finally after-treat in a separate bath made up with

3 lbs. Potassium Bichromate

for 3/4 of an hour.

Chromogene V O possesses very good fastness and will be found an excellent color in the dyeing of blues and dark violets.

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Recipe No. 93

GREEN ON RAW WOOL

Alizarine Green B L on 100 lbs. raw wool. Prepare dye bath with

3 lbs. Chrome.
3 lbs. Ground 1/2 Refined Tartar C.

Boil 1 1/4 hours. Rinse. Dye with

4 lbs. Alizarine Green B L.
(American Dyewood Co., 80 Maiden Lane, New York, N. Y.)

Dye at a boil for 1 1/4 hours.

Alizarine Green B L is a very level dyeing color, and is of very good fastness to light and fulling.

Recipe No. 94

ORANGE ON RAW STOCK

Alizarine Orange A Extra on 100 lbs. raw wool. Prepare dye bath with

3 lbs. Chrome.
3 lbs. Ground 1/2 Refined Tartar C.

Boil 1 1/4 hours. Rinse. Dye with

3 lbs. Alizarine Orange A Extra.
(American Dyewood Co., 80 Maiden Lane, New York, N. Y.)

Dye at a boil for 1 1/4 hours.

Alizarine Orange A Extra possesses excellent fastness to light and fulling.

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Recipe No. 95

VIOLET ON COTTON YARN

Thio Indigo Violet 2 R Paste on 100 lbs. cotton yarn. Prepare the dye bath with

10 lbs. Thio Indigo Violet 2 R Paste.
(Kalle & Co., 530 Canal St., New York, N. Y.)
3 lbs. Caustic Soda.
4 lbs. Hydrosulphite Conc. Powder.

Reduce the color at 130° F., and then dye at 140° F.

When completely reduced the dye bath is of an olive green color.

After dyeing the color may be improved by treatment in a boiling soap bath for 1/2 hour.

The standing bath requires only 60 per cent. of this amount of color.

Thio Indigo Violet 2 R Paste possesses excellent fastness to all of the common color destroying agencies.

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Recipe No. 96

YELLOW ON COTTON YARN

Thiogene Yellow G H Conc. on 100 lbs. cotton yarn. Prepare the dye bath with

5 lbs. Thiogene Yellow G H Conc.
(H. A. Metz & Co., 122 Hudson St., New York, N. Y.)
10 lbs. Sodium Sulphide.
5 lbs. Soda Ash.
40 lbs. Common Salt.

First add the soda ash and common salt to the dye bath and bring to a boil. Add color dissolved in sodium sulphide and dye for one hour at a temperature near the boiling point. After dyeing the color may be more fully developed by rinsing in a bath containing acetic acid or formic acid.

Thiogene Yellow G H Conc. possesses very good fastness to washing, alkalies and acids.

New Machinery and Processes

This department is designed to present from month to month a brief mention of new machinery, devices and processes being brought out in this country and abroad, that are of interest to the textile manufacturers. It is not a list of patents but of improvements on the market, the idea being to present to our readers a systematic monthly record of new machinery, etc., of interest to textile mill men.

Whenever possible we endeavor to make a personal investigation of the new machinery and processes described in this department. In the absence of such personal investigation we must necessarily rely upon information obtained from those who control the machines and processes.

We invite machine builders and others to send us such information for this department.

Open Top Extractor. The Tolhurst Machine Works, Troy, N. Y. An improved open top extractor which is described in this issue.

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Tape Driven Twister. The Draper Co., Hopedale, Mass., have recently made important improvements in the Hopedale twister. A description appears in this issue.

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Welt Folder. W. D. Butz, 625 Bourse Bldg., Philadelphia, Pa., is the sole American agent for the "Universal" welt folder which is described in this issue.

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Warper Creel. Charles H. Knapp, corner Wait and Rye Sts., Paterson, N. J. An improved warper creel for accommodating a large number of spools without a wide spread of the ends. A description appears in this issue.

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Guide for Cloth Dryer. A. Monforts, M. Gladbach, Germany. An automatic device for guiding cloth to drying and tentering machines. It embodies an electrical arrangement and dispenses with the attendant. L. H. A. Schwartz & Co., Boston, Mass., are the American agents.

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Magneto Generator for Electric Warp Stop Motions. The Holtzer-Cabot Electric Co., Brookline, Mass., has designed a special generator for electric warp stop motions and bell alarms in mill service, which will take the place of batteries. This magneto generator overcomes battery troubles and attendant expenses. It is driven from the main shafting. The friction is reduced to a minimum with Hess-Bright ball bearings.

Conditioning Oven. W. Isherwood & Co., Manchester, England. A conditioning oven in which electricity is used for heating purposes. The air is kept in circulation by an electric motor. It is claimed that the efficiency of the apparatus is much increased.

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Roller Covering. The "Ideal" Covering Co., Bolton, England. A composition covering for rollers of drawing and spinning frames. The material is moulded in the form of tubes of different sizes which are cut to the length required. It is claimed that the material is elastic and very durable. The "Ideal" roller covering has been in use for about a year in English mills giving good results.

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Purifying Coal. S. Redfern & Co., Manchester, England. A product called "Non-Reok," for purifying coal and preventing black smoke. The material is supplied in the form of a powder, which is mixed with water, the moisture being sprinkled on the coal.

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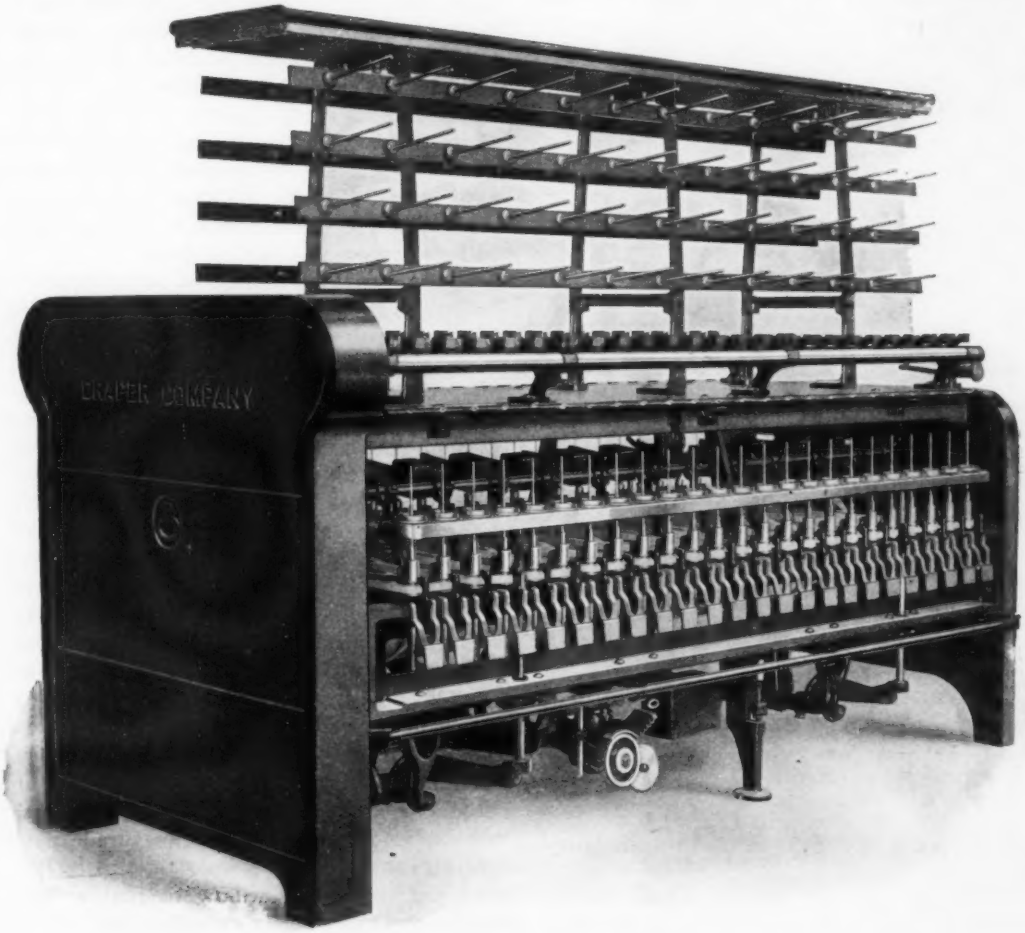
Lithographic Process for Calico Printing. The Hayes Printing Machinery Co., Hertfordshire, England. A process by which colors are printed on cotton cloth and the customary practice of fixing colors after printing is avoided. The pattern is first drawn on white metal plates which are transferred by a lithographic process to the printing rollers. It is stated that an ordinary design can be put on the plate and transferred to the roller, and the machine started for running off the pattern, all in a few hours. There is practically no limit to the size of the pattern rollers that can be used.

THE HOPEDALE TWISTER

The standard twister built by the Draper Co., Hopedale, Mass., is designed to give stiffness to the frame in order to carry the spindles operating at a high speed without undue vibration. The all metal creel board has recently been adopted for this machine. The covers at the head end are easily removed and are held when in place by automatic locking devices; the spindles have capacity for high speeds; the steps are adjustable in case of wear; the rings are made by special processes and appliances; with vertical rings of three inches diameter or larger. The Carter oiling device lubricates the traveler below its contact with the yarn, allowing the speed to be increased; the spindle brake is desirable on heavy spindles; it contains a leather friction pad which comes in contact with the whorl, pressure being applied by the knee pad. A guard rail protects the brakes from injury from moving trucks, etc.

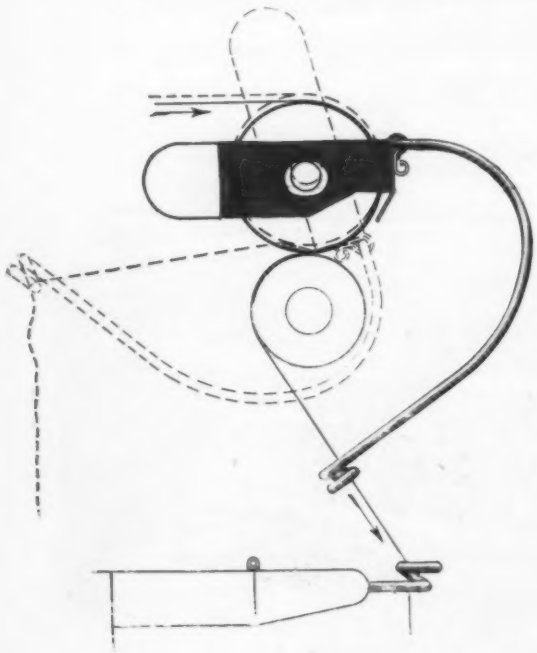


THE NEW TAPE DRIVEN HOPEDALE TWISTER.

The twist gear is arranged directly on the end of the cylinder shaft. This gives a greater range with less changes and the gears make less noise. All the gears on the Hopedale twisters are machine cut and in-

terchangeable. The traverse motion is fitted for change gears so that the speed of the ring rail can be adjusted without changing the twist. By use of a lever clutch the worm of traverse motion can be thrown out of gear so that the ring rail may be lowered at any time when necessary.

The Smith stop motion, shown at Fig. 1, for two ply work eliminates waste, prevents roller laps, enables the help to tend to more



THE SMITH STOP MOTION.

spindles, and in some cases allows the speed to be increased.

The new tape driven Hopedale twister, shown at Fig. 2, has the usual construction of frame with metal creel and steel top boards. The spindles are driven by tapes with four spindles in each group, using an improved system of mounting the idler pulley.

For novelty yarns the Rhoades patent adjustment is recommended by the Draper Co. It can be attached to any Hopedale twister if desired. The Draper Co. have recently issued a special circular showing illustration in colors of various styles of fancy yarn made with the Rhoades attachment.

THE SHAUGHNESSY COTTON WASTE MACHINE

The improved machine for reclaiming cotton waste, shown in the accompanying illustration, is built by the Smith & Furbush Machine Co., Philadelphia, Pa. This machine is used for cleaning and removing dirt, shells, seeds and other foreign mater from, and improving the condition of almost all forms of waste cotton, such as motes, mill fly, strippings, and practically all kinds of cotton mill waste except floor sweepings that contain hard twisted threads. The machine will also clean and put in excellent condition, wets and drys from the cotton bale, factors' or brokers' samples, warehouse and compress sweepings, gin flues, grabbots or immatured cotton, thrash cotton or any kind of dirty, seedy or damaged cotton that is free from jute or other hard twisted strings. It removes the foreign matter and delivers the cleaned cotton in excellent condition, well opened, and without in any way injuring or shortening the original fiber. It does this without losing any of the spinning fiber of the stock put through. The resultant product can only be appreciated by those who have seen samples before and after putting through the machine, because the product is so far superior to that of the so-called cleaning machines heretofore offered, that cleaning, in the sense that this machine does it, is difficult for anyone to appreciate who has not actually seen the results. On stock that contains a great deal of dirt, such as motes, mill fly, very low strips and low grade cottons, this machine is used after the stock has been put through a willow to remove the heavier and more easily extracted dirt.

The stock is thrown into the hopper of the self-feed and is delivered by it in uniform quantity to the feed table of the first section of the reclaiming machine. It passes from the feed table through metallic-toothed feed rolls to the toothed main cylinder, which carries the stock down and past, first, a specially constructed cleaner roll, which removes and drops the larger pieces of foreign matter; then to a series of toothed under-workers, which open the stock and separate from the fiber and drop more of the dirt and par-

ticles; then past a small special beater, which removes or beats out more foreign particles, after which the cotton is removed from this main cylinder by a brush, which delivers the stock to a double screen condenser and suction cleaner; this in turn delivers the stock in the form of a soft lap to the feed rolls of the second section. The second section handles the stock in a similar manner to the first section, but is finer clothed, and is adapted to separate, remove and drop smaller particles than the first section.

The stock in soft lap form is continuously received from the condenser of the second section by a triple blade beater or finishing section, which, in turn, throws the stock into a stock room; or an overhead condenser may be used to receive the stock, remove the air and dust and drop the stock into a bin or baling press. Each condenser on the machine is provided with a suction fan that removes the air delivered along with the stock by a brush before the stock is fed to the next section of the machine. The outlets of these fans should be connected with sheet-iron pipes, to carry the waste air and dust out of the room. The entire machine is so different in construction that it cannot be compared with any other machine heretofore offered for cleaning stock, and it does work that has never heretofore been accomplished.

The machine has proved in actual practice, upon a great variety of stock, the excellence of its design, and the convenience and ease of its operation. The perfection of results obtained and the wearing qualities of the cleaning and opening cylinders are rendered possible only by the use of the metallic-toothed steel wire clothing set directly into the body of the cylinder and firmly calked therein. This wire clothing is manufactured by the Smith & Furbush Machine Co. from the very best steel wire obtainable for the purpose, on improved machinery of their own design. They issue a special circular devoted to a description of the metallic-toothed wire they manufacture for use in clothing these cylinders, and of the improved method used in setting the wire into the cylinders.

The frames, girts and inverted arches are heavy, and the metal is distributed where it will do the most good. The surfaces that meet are planed, doweled and bolted together, making an unchangeable and firm

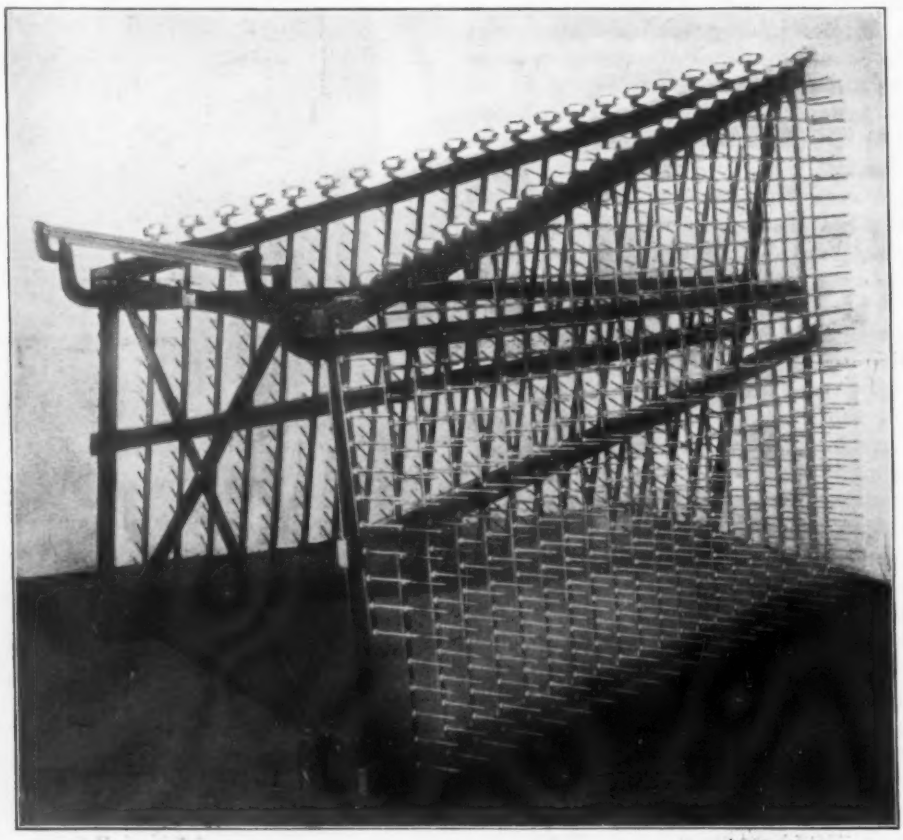
THE SHAUGHNESSY COTTON WASTE RECLAIMING MACHINE.

construction that will not become disarranged. The worker poppets are located on the outside of the inverted arches, and are adjustable in four directions by adjusting screws in such a manner as to remain rigid after being locked in place. The bearings are long and of the finished ball and socket type. All parts are well finished to standard sizes, and are, therefore, interchangeable. Brass-bushed ring-oiling bearings are provided for main cylinders and brushes. These brushes are solid and removable.

The automatic self-feed is of their well-known design, and is an excellent machine for the purpose. The Smith & Furbush Machine Co. issue a special circular devoted entirely to this machine, of which they have many hundreds in use. The condensers are simple in construction, of ample strength, and work easily. The finishing beater is powerful in design, and does its work thoroughly. John W. Shaughnessy, of Charlotte, N. C., the inventor of the machine, has had many years experience in handling all grades of wool and cotton waste. His experience and that of the builders has resulted in the production of a machine which is believed to be unexcelled for this line of work.

AN IMPROVED WARPER CREEL

This warper creel, built by Charles H. Knapp, corner Wait and Rye Streets, Paterson, N. J., is designed for a large number of spools without a wide spread of the ends. The creel shown in the illustration has one thousand pins to receive spools 2 1/4 inches



AN IMPROVED WARPER CREEL.

in diameter and 4 inches long, the spread being 50 inches in front. The Knapp creel is made in different sizes, one recently built having 1,250 pins for spools 11 5/8 inches in diameter and 3 1/2 inches long. Another creel that Mr. Knapp recently delivered had 560 pins for spools 4 1/4 inches in diameter and 7 inches long. Each row of pins has a comb read to separate the ends. Also a porcelain roll to reduce the friction. A comb reed is supplied having dents corresponding with the number of pins used. It is placed back of the glass bars at the front of the creel.

METALINE BUSHINGS FOR LOOSE PULLEYS

Textile manufacturers will be interested in the oilless metaline bushings, Fig. 1, sold by the North American Metaline Co., 64 West Ave., Long Island City, N. Y., and used for loose pulleys. The difficulties in the use of oil or grease on loose pulleys are well known. A thin oil runs away too fast, exhausting the supply and making a great mess that collects and holds dirt; thick oils or greases are not sure to flow fast enough. An oil or grease that will not flow until the heat from the bearing causes it to do so should be rejected. It is also desirable to throw all the wear on the bearing, the surface of the journal remaining intact. The operation of oils and greases is to interpose a thin film between two comparatively rough surfaces, and so long as it keeps them apart while one or both are in motion the result is satisfactory. Further than this, a lubricant is supposed to produce its effect by filling up the depressions and spaces between the ridges that exist in all bodies, however smooth, thus converting the friction between the rough and unyielding surfaces into the friction between smoother bodies. The metaline bushings overcome these difficulties by filling up and making the surfaces smoother and less liable to wear. It is claimed that where metaline is in bearing contact there is no wear whatever on the journal.

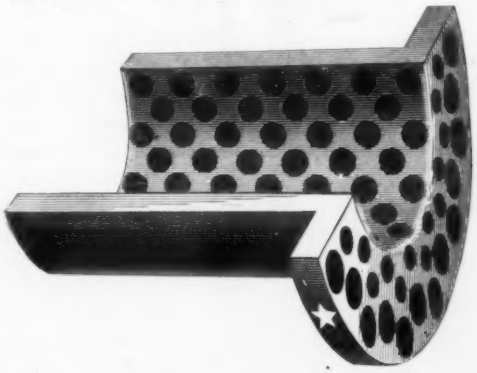


FIG. 1.

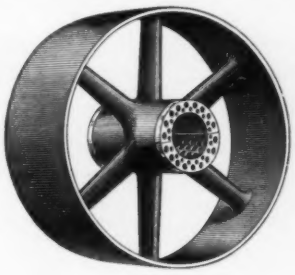
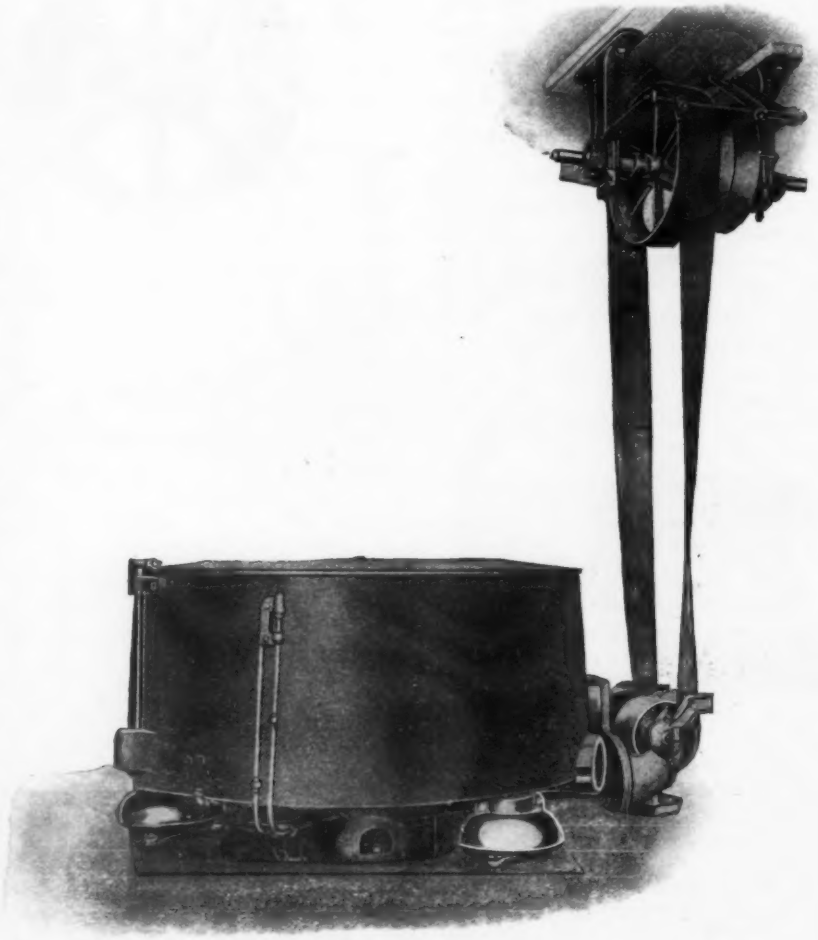


FIG. 2.

Metaline is composed of metallic oxides and other substances reduced to an impalpable powder and then solidified in hardened steel moulds under great pressure into short length "plugs" 3/6 inch, 1/4 inch and 5/16 inch in diameter. The mode of application is to make a divided bushing of "gun metal bronze," "phosphor bronze," or "composition metal" of a good quality, close, fine grained and free from blow holes (cast iron, steel, Babbitt or similar metals are more or less objectionable), machine to required dimensions, the two halves separated and holes drilled into the bearing surface, not all the way through the wall of the bushing, into which the metaline plugs are tightly fitted and then filed, finished flush with the bearing surface, care being taken that the layout or spacing of the plugs is such that they will overlap or break joints, particularly on the line of motion.

Fig. 2 shows a loose pulley fitted with a set of two complete metaline bushings. These bushings have given specially good results in textile mills. We are informed that the Kitson Machine Company have pur-

chased over 20,000 metaline bushings and are still using them. The Botany Worsted Mills have used the metalined bushings for 16 years. The superintendent writes to the Metaline Company as follows: "Could not use any other style of loose pulley with fluid lubricant on account of the danger of spotting goods."



THE TOLHURST OPEN TOP EXTRACTOR.

THE TOLHURST OPEN TOP EXTRACTOR

The illustration shows the new Tolhurst open top extractor built by the Tolhurst Machine Works, Troy, N. Y. It is built to be driven either by belt or directed connected motor. The three bearings which allow the case to oscillate are entirely under the case and out of the operator's way. This allows trucks to be run close to the machine at all points. The mechanical oiling device makes the lubrication of all bearings positive. A centrifugal pump directly connected to the basket spindle, which can be run in either direction, throws a stream of oil into the bearings which then flows back through a fine screen to the oil well and is used over again.

The counter shaft for starting and stop-

ping the machine is placed on the ceiling, reducing the floor space required for an extractor. This machine is equipped with self-oiling adjustable idlers, which permit the use of any size driving pulley. The motors used for driving this extractor have high starting torque and are wound for either direct or alternating current. Starting devices, either hand operated or automatic, with time limit or current limit characteristics may be used.

—+—

COLOR MATCHING BY ARTIFICIAL LIGHT

BY G. A. BARKER

An apparatus for matching colors by artificial light has been invented by Dr. Herbert R. Ives of Cleveland, O., and is now being manufactured by a firm in Conneaut, O. The "Tungstolier Truetine," as the apparatus is called, consists of a wooden framework, 18 inches deep, 30 inches wide, 28 inches high, provided with roller curtains on each of its four sides, as seen in the accompanying illustration. The inner side of each curtain is whitened, as are all the inner surfaces of the cabinet. The interior of the cabinet may be divided into two compartments by means of a fifth curtain, or the curtain may be raised, converting the interior into a single lamp compartment. Near the top of the cabinet are located, side by side, two circular glass discs, each nine inches in diameter. The composition of these glasses is used and of the coloring material with which it is coated provide the basis for the successful operation of the apparatus. Above each of the two discs is a 100-watt Mazda lamp surmounted by a reflector designed to project the light downward through the discs. There is no feeding or regulating machinery of any sort connected with the burning of the lamps; they are merely regular Mazda incandescent lamps which can be removed and replaced in a few seconds. No transformers of any sort, or extra high voltages, which might constitute a life hazard, are employed. The cabinet is portable, weighing complete with lamps, curtain, discs, and attachment plug about 50 lbs. The lamps are constructed with the drawn-wire filament, which insures sufficient mechanical strength for portable service.

In using the apparatus in rooms where other artificial lights,—on chandeliers, drop-cords, etc.,—are burning, as much of this extraneous light is excluded as possible, by pulling down the curtains on the sides of the framework and by using the apparatus, in the darkest part of the room. So long as the

THE "TUNGSTOLIER TRUETINT" AN APPARATUS FOR MATCHING COLORS.

outside lights do not shine into the cabinet they cause no trouble; for example, there might be a light on the ceiling directly above it or behind it, but the cabinet should always face in such a direction that there will be no lights in front of it. The cabinet may be used wherever most convenient, but in many establishments it will probably be well to have a special room of small dimensions set apart for those who have to operate it. The color of average daylight, which is the standard of white and which it is the object of this apparatus to reproduce, is not simple color but is a mixture of a large number of colors in different proportions. There is, for example, a small percentage of deep red, a larger one of orange, a larger one of yellow, a still larger one of green, a smaller percentage of blue, a still smaller one of indigo, and

a still smaller percentage of violet. Besides those just mentioned there are hundreds of colors in daylight, many of which have no special names but shade off so imperceptibly as to be hardly distinguishable from each other. The principal obstacle to the successful imitation of daylight in the past has not been the securing of a light that would contain all of these colors, for that is readily enough done. Any incandescent lamp contains all of the constituent color of sunlight, but the crucial point is, how to get these colors in the same proportions in which they exist in daylight. The two bluish discs of the Truetint solve this problem. Their bluish tint is caused by a complex absorbing medium, so designed as to reduce those colors which exist in excess in Mazda light to the proper relative intensities which they should have in order that, taken as a whole, they may be a reproduction of average daylight. In Mazda light we have all the raw materials for daylight. What the disc does is to select these materials in the proper proportions. An ordinary piece of bluish glass would not do this. It is necessary that the discs be made by a scientifically prepared formula, and be subjected to careful tests to insure their color trueness.

Natural daylight itself varies. It is of a different color at noon that it is at sunset, and is different in the country from what it is in the crowded city. In the city the daylight takes on a reddish tint, due partly to the many brick walls, and due also very largely to the smoke, fog and dust-laden air, which give the daylight a reddish tinge for the same reason that the thick layer of atmosphere through which the sun's rays have to penetrate just before sunset gives the latter its rosy appearance. In the rural districts the daylight has a greenish tendency augmented by reflection from the foliage. It is possible to obtain slightly modified discs for the Truetint for cases where it is desired to obtain a pronounced "city daylight" or a "country daylight." Usually, however, the so-called average daylight is found satisfactory for all color matching purposes.

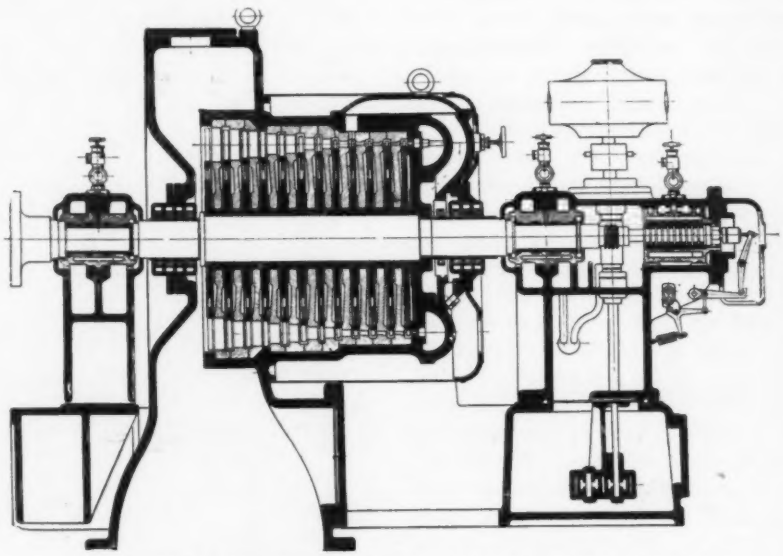
THE DELAVAL MULTI-STAGE TURBINE

The general arrangement of the DeLaval multi-stage turbine is shown in the accompanying illustration. The rotating member consists of a heavy shaft upon which is mounted a series of discs, or wheels, each revolving in an independent cell or chamber formed between diaphragms. Steam is admitted to the steam chest at the right end of the casing, and flows through nozzles and impinges upon the buckets of the first wheel. The multicellular arrangement used in this turbine is conducive to safety, in that it permits the use of a comparatively short, stiff shaft, and of discs or wheels of such design that the maximum strength of the material is utilized. It is not difficult to build turbines of this type that will operate smoothly and with a large factor of safety at any desired speed, but since the possibility of overspeeding through failure of the governing devices exists, due either to defects or to the ignorance of attendants, it has been considered advisable to augment the natural ruggedness of the multi-cellular type of turbine by surrounding the wheels of the DeLaval turbine with heavy forged steel armor bands, which will effectually prevent penetration should the wheels be ruptured by racing or other cause. This feature will be explained more fully in connection with the design of the several parts.

The nozzles employed in the first stage are formed of tubes carefully bored and reamed and set in the nozzle ring, or they may be bored and reamed directly in the nozzle ring itself. The nozzles of this stage occupy only a portion of the circumference, thereby avoiding the difficulties of very short blade lengths always encountered where full admission is employed in the first stage. Any or all of these nozzles may be controlled by hand-operated valves seating upon the inlet openings. These valves, however, are not used for speed regulation, and are not operated automatically, as it has been found that the opening or closing of one or more nozzles at a time by a governor is apt to induce surgings and fluctuations, in speed, especially where several turbo-generators are

operating in parallel or supplying current to rotary converters.

The nozzles or guide vanes between stages are made of nickel bronze, accurately formed in dies, are spaced and located upon the rim of the diaphragms by pins and are held in place by solid steel bands shrunk over their tips. These steel bands are wider than the blades and diaphragm and touch one another, forming a continuous cylinder, which encloses, not only the diaphragms, but



THE GENERAL ARRANGEMENT OF THE DELAVAL MULTI-STAGE TURBINE.

also rotating wheels. A complete lining of forged steel is thus provided for the wheel case, making rupture of, or damage to the wheel case impossible, if by any chance a wheel should burst. This steel armor is a desirable precaution, since instances have been numerous where turbine wheels, disrupted by over speeding, initial defects, unbalancing due to loss of buckets, breakage of shaft or leaving of tools in the casing during repairs, have burst and dismembered parts have penetrated the casing, destroying surrounding machinery, buildings and life.

The speeds of steam turbines are far in excess of the speeds of ordinary machinery and the effects of gravity are inconsiderable as compared with those due to centrifugal force. Further, it is impossible to build a shaft or wheels which are absolutely correct and perfectly balanced, and even were this possible, the least vibration of the shaft when running would destroy the balance. It is therefore important that the shaft be so stiff that resistance to bending under all conditions is greater than the centrifugal force, if the shaft is to maintain its original position, as is necessary where the shaft passes through packings in internal diaphragms. The large size and hence the stiffness of the shaft used in DeLaval turbines will be evident from the longitudinal section presented herewith.

DeLaval turbines are not subject to leakage of steam from one side of the wheel or bucket to the other, since the pressure of the steam is equal on both sides of the bucket. The only leakage possible is from stage to stage along the shaft where it passes through the diaphragms and the turbine casing. The labyrinth packings employed at these points in the DeLaval turbine are unusually long and the great stiffness of the shaft permits of a minimum running clearance. The lubrication of the DeLaval turbine is insured by a circulating pump of the

positive gear type, driven from the lower end of the governor spindle. Oil, under high pressure from external sources, or forced lubrication, is not required, although the lubrication of a multi-stage is positive in all respects.

The governing mechanism consists of, first, a powerful speed regulating governor operating a balanced valve and admitting steam to the steam chest of the first pressure stage. The rate of flow of steam through a turbine, as well as the power developed, is nearly proportional to the initial steam pressure, so that practically the same efficiency can be obtained by initial throttling as by cutting out nozzles, and if automatic throttling is supplemented by hand-control of the nozzles at times of overload, the resulting advantages, combined with equal efficiency, are greater dependability, reliability and freedom from "Hunting" to which turbines utilizing the principle of having the governor cut out nozzles automatically are subject.

Since the turbine might overspeed through failure of the speed governor, or through the lodgement of scale under the governor valve, or due to leakage of the governor valve itself, it is essential that a speed-limiting device be provided in addition. In the DeLaval multi-stage turbine, the safety governor is mounted on the end of the main turbine shaft, entirely independent of the main speed governor, and may be adjusted to act at any predetermined speed. The governor trips a small valve which releases steam pressure from under a small piston in a combined trip and throttle valve, whereupon the balanced disc of the latter is immediately forced shut by the pressure of steam acting upon a piston. This trip valve is placed ahead of the main governor valve and protects the turbine in case of leakage of the latter. It can also be tripped by hand and is intended for use as a throttle valve for starting and stopping the turbine.

Tests have shown the DeLaval helical gears to have an efficiency of 98 to 99 per cent. To obtain such results together with perfect smoothness of running, the DeLaval Company considers the following points essential:

1. The gear must be of the helical type, in order that the transmission of pressure from one tooth to another may be uniform and without shock and vibration.
2. The angle of the teeth should be such that several teeth are always in contact.
3. A true involute tooth should be used in order to secure line contact on each tooth as long as it is in mesh.
4. The gear must be of the twin or double pattern.
5. The unit pressure must be reduced to a point where the film of oil will not be squeezed out from between the teeth.
6. The gear and pinion must be rigidly supported in the same plane and at the proper distance apart; and
7. The gear and its pinion must be so accurately cut that they will have the correct contours and angle, so that the pressure on the teeth may be uniform. The pitch and angle must be exact and unvarying.

THE TAPLEY ELEVATING TRUCK

The accompanying illustration shows the Tapley elevating truck sold by the T. W. & C. B. Sheridan Co., 56 Duane St., New

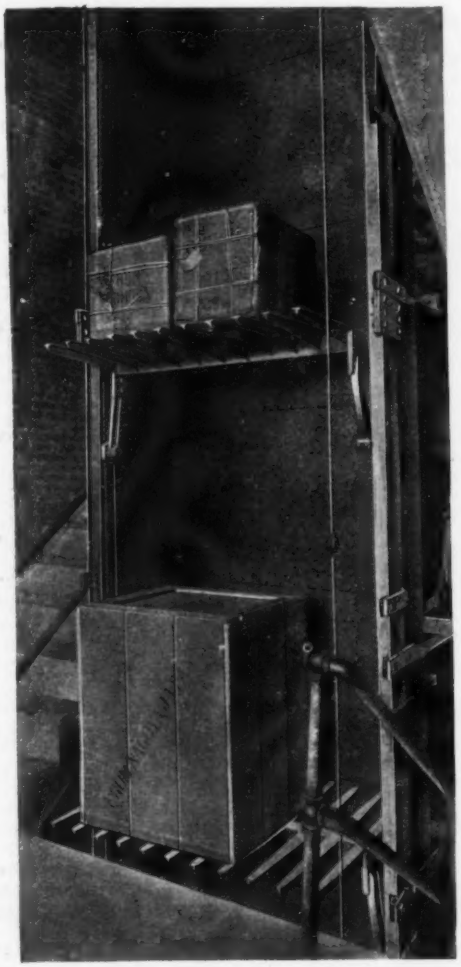
THE TAPLEY ELEVATING TRUCK.

York. It is recommended as the most modern, efficient and inexpensive method of handling material in factories and warehouses. It is claimed that one Tapley truck

and 50 platforms will take the place of 50 flat trucks and that the saving will pay for the expense of the change in the first three months by reason of the reduction in labor, in the cost of repairs and in floor space.

LOWERATOR FOR HANDLING MERCHANDISE

This device, built by Lowerator Co., Inc., 631 Kent Ave., Brooklyn, N. Y., is designed



THE LOWERATOR IN OPERATION

for lowering merchandise in mills, warehouses and similar establishments. The lowerator handles goods downwards only. It requires no motive power, the weight of the merchandise serving that purpose. No operator is required, the device being controlled from the different floors and it unloads automatically. The lowerator consists of a series of cars attached to endless cables running on sheave pulleys at the upper and lower terminals. It travels from 60 to 120 feet per minute, is built any height, and is arranged to discharge on packing tables or conveyors. An automatic governor brake regulates the speed regardless of the weight of the load. The cars are easily loaded while the machine is in motion. The lowerator is built of steel and iron throughout and is in successful use in a large number of establishments. It meets the demand for the quick movement of merchandise from the upper floors to the shipping room. The cars have an individual guaranteed carrying capacity of 600 pounds and will carry a package 32 inches deep, 40 inches wide and 70 inches high. Further information can be obtained from the builders.

PROCESS FOR TREATING FABRICS

A method of treating fabrics to render them proof against damages from moisture and insects has recently been patented in this country. It is especially adapted for bags for holding grain, sugar and other perishable goods. The fabric or other material is first saturated in a salt solution, formed from 50 pounds of salt to 5 gallons of water. After saturation the excess moisture is removed by wringing and the goods are thoroughly dried. The fabric is them immersed in a bath of heated paraffin and afterward dried. The salt coating upon the fibers of the fabric forms a preventive against attacks of insects or rodents to which it is repulsive and also prevents decay of the fibers. The coating of paraffin closes the meshes of the fabric to prevent the escape of fine material from a bag and also renders it proof against moisture and water. It also preserves and strengthens the material. This method thus produces a fabric for bags which is protected against insects and rodents and also rendered waterproof.

Continuation of Papers read before the meeting of the National Association of Cotton Manufacturers.

ON THE BUYING OF LABOR

By JONATHAN THAYER LINCOLN, Fall River, Mass.

(Continued from May.)

We have seen the several forces that make for labor legislation clearly illustrated in the case of the woman core-makers. In the legislation to abolish child labor in the South two seemingly antagonistic forces were also at work; the reformers, for purely humanitarian reasons, and the manufacturers because very young children are not efficient workers. And opposed to these two forces were the parents of the children, who, in many cases, believed that they were being defrauded of their right to the labor of their children. The obvious lesson is that a more sympathetic understanding should be established between the manufacturer and the reformer; and one means to this end is offered to us in the invitation extended by the Massachusetts Association for Labor Legislation. Within such an organization manufacturers and reformers may become better acquainted.

The recent strike at Lawrence directs our attention to another phase of the labor problem to which we shall be compelled with increasing necessity to devote our attention, the question of immigration. For one, I do not look with fear at the rising tide of immigration and I believe that we should gladly welcome to our shores men and women of all nations. The Greek brings to America the latent culture of the land of Socrates, the same blood that ran in the veins of Kosciusko animates the Lithuanian, the spirit of Kossuth comes to us with the Hungarian. Dante was an Italian, nay more, the Carpenter of Nazareth was an artisan and a Jew. America has need of all these immigrants and because of them there will yet appear upon our shores a civilization greater than the world has known before.

This may seem rank optimism with the lesson of Lawrence before our eyes. We have read with amazement the preamble of the I. W. W. which begins as follows: "The working class and the employing class have nothing in common. There can be no peace so long as hunger and want are found among millions of working people and the few who make up the employing class have all the good things of life. Between these two classes a struggle must go on until the workers of the world organize a class, take possession of the earth and the machinery of production, and abolish the wage system. . . . Instead of the conservative motto 'A fair day's wages for a fair day's work,' we must inscribe on our banner the revolutionary watchword, 'Abolition of the wage system.' It is the historic mission of the working class to do away with capitalism. The army of production must be organized, not only for the everyday struggle with capitalists, but also to carry on production when capitalism shall be overthrown. By organizing industrially we are forming the structure of the new society within the shell of the old." And when we read the incendiary speeches of the leaders of this movement in which they "acknowledge no flag but the red flag," the symbol of bloodshed and revolution, it may well give us pause. Yet immigration, like labor legislation, should not be abolished, but intelligently regulated. Let the foreigners come to our shores and then let us make of them American citizens. I have long been interested in the work of the North American Civic League for Immigrants. And I asked the president of our league, Dr. Chauncey Brewer, for a statement concerning its work. In reply I have received the following notes:

"The North American Civic League for Immigrants recently appointed an Industrial Committee of fifteen to cooperate with its central Board and the Chairmen of its local committees in the various mill centers.

"This Committee has studied the work of the League and has decided that the ends which it has at heart are subserving the selfish interests of manufacturers as well as appealing to sentimentalists. They have therefore underwriten a budget to try out an industrial program presented by the League, in the Merrimack Valley. If this is found successful, it is hoped that it will be generally adopted.

"Coming in touch with men who view the immigrant alien as an economic unit, the League insists that the manufacturer, working to increase his profits, must give the same attention to this unit as he is giving to labor saving devices, etc. It claims that if this is done there will be a great saving of waste, a dimunition of the number of work accidents, and increase in efficiency. Anyone can see that if such ends can be secured, there will be immediate advantage.

"Meanwhile the man who is taking the broad view will note that by developing the best that is in this same immigrant unit, he is indirectly benefiting himself by winning the confidence of his employe and outflanking the red socialist and anarchist agitators.

"I might add that we are about to try out in Lawrence a system which provides:

"1. For the teaching of English to the foreigner.

"2. For the blocking of schemes which affect the usefulness of an employe:

"(a) By impoverishing him.

"(b) By alarming him (see the work of blackmailers).

"(c) By affecting his physical health.

"Failure to properly consider the immigrant population produces conditions which encourage impracticable socialists to seek embarrassing legislation."

Let me now sum up the thoughts that I have thus far tried to make clear. First, the labor problem is something far greater than a question of wages, something other than a mere bargain between the buyer and the seller of a commodity. It is not only an economic problem, but a social problem, involving the welfare of the entire community,—it is in fact the fundamental problem of our modern democracy. I then, speaking frankly

from the manufacturers' point of view, emphasize the fact that those engaged directly in the production of the commodities were not the sole employers of labor, that those engaged in the distribution of commodities were likewise employers, and, paying no higher wages than the manufacturers, made greater profits. While we are willing to be reformed of any abuses that may justly be charged to us, we believe that the public should give us an impartial hearing.

I then suggested the necessity that we are under to devote more attention to directing intelligently labor legislation and I called your attention to the work of the Massachusetts Association for Laobr Legislation which seeks by unifying in one body not only employers and employes, but all who are intelligently interested in the problem, to obtain just and sane labor laws. I referred to the increasing difficulty in solving the labor problem occasioned by the vast immigration of a foreign population of the lowest order,—and yet a population capable of high economic and social development under our democratic government. The menace to our "free institutions" of a situation to that which recently obtained at Lawrence is not a menace at all if we will but study the situation and profit by it; and to this end I called your attention to the subject of immigration. As a member of the North American Civic League for Immigrants I ask you to support this movement, which seeks by assimilation to remove the menace of immigration. The factory needs the immigrant and the immigrant needs us.

In conclusion I desire to place before you a few thoughts concerning the labor problem in its broader aspect and as it touches the social life of the community. However much we may dislike such phases as class war, wage slavery and the like, these phrases are in some measure based upon real conditions growing out of the development of two very definite economic classes,—the employing and the employed. In a strict analysis the interests of these two classes are identical, but this common interest is now but vaguely understood and instead we find a bitter antagonism. By the employed I mean all workers who depend for their subsistance upon wages paid by another and are unable to convert any part of their wages into capital; and by the employers I mean not only those persons who as individuals or as servants by the labor of other men, but all who depend for their support, in whole or in part, upon investments in industrial undertakings. I make these definitions because in what we call the conflict between labor and capital it is more difficult to draw a sharp line between the opposing forces than at first appears. The first step towards the fulfillment of the democratic ideal is to make intelligible the common interests of the employer and the employe and thus reconcile the antagonism,—to unite these two apparently antagonistic classes in a common cause to which both may be loyal. The reason why scientific management at the present moment appeals so strongly to the popular imagination is, I believe, not only because men see in the efficiency program a possible method by which our highly perfected machinery of production may be made to minister to the common welfare, but also because it emphasizes the common interests of employer and employe.

STEAM PLANT EFFICIENCY IN TEXTILE MILLS

By RAYMOND L. FOSTER, Engineer, Fitchburg Yarn Co., Fitchburg, Mass.

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(Continued from May.)

DRAFT

With draft we get the capacity of our boilers. It is as important in obtaining our rating of the boiler as the grate or heating surface. The time is not far distant when this item will not be omitted in quoting the horse power of a boiler. A current of air passing up through the grates and fuel supplies the necessary oxygen for combustion. The hot gases follow up through the tubes, through the economizer and up the chimney. This natural process, controlled by the law of gravity, is the theory of our chimney. The greater the difference in temperature between the gases in the chimney and the outside temperature, and the greater the height, the more pressure we get in the ash pit. The stronger current give us more oxygen, therefore a higher rate of combustion, and increases evaporation. Theoretically a chimney 100 feet high will give us .6 inches at the base, with gases inside at 450° and atmosphere 60°. In our plant we would need one 160 feet high and 6 feet in diameter at a cost of about $5,000.

INDUCED DRAFT

An induced draft system with a 75-foot steel stack would cost with a relay engine about $2,000 and give us control of our oxygen, rate of combustion, and amount of evaporation per square foot of heating surface; or in other words, double the capacity of our boilers if necessary.

This draft is preferable to forced draft, as it gives you power where wanted, at the foot of the stack. Forced draft pushed beyond a certain limit chokes up. An induced draft cannot do this.

FEED PUMPS AND PIPING

Remembering that we are not to make any unnecessary by-product, we will install a six-plunger power pump, and not a steam pump, for our day feed to the boilers. However, we will provide a steam pump, but for emergency and night feed only. In installing feed piping, the mistake often comes with too small pipe at the boilers. On this plant all feed pipe will be 4-inch brass with 2-inch branches to each boiler. There are two points to be gained with ample size feed pipes. One is to protect the pump and economizer from excess pressure, and the other is to have controller valves large enough to supply with small lifts.

BUILDING

The boiler house for this plant will take 31 by 60 feet floor space, and 40 feet high.

STEAM PIPING

Let us carry our steam now from the boilers to the engine. In erecting our 60 feet of main steam pipe, running through the center of the boiler room, we must guard against two evils, vibration and loss of pressure. One is caused by the sharp cut-off of the high speed Corliss valve,

and the other by friction, radiation and lack of supply.

Vertical boilers working under 190 pounds pressure per square inch, with 18-foot tubes, giving 50° to 70° superheat, connected to a 12-inch main steam pipe by 7-inch long bends, and a receiver over the throttle 3 1/2 times the volume of the high pressure cylinder, will give us dry steam at the throttle with a loss of about one pound pressure.

The pipes are to be double covered. With this arrangement vibration will be practically eliminated. Some will doubt these statements, but they are facts. At the Amoskeag Manufacturing Company, Captain Manning erected a steam pipe 1,325 feet long, from a battery of Manning Boilers to a 1,500 horse power Corliss engine, 975 feet of 20-inch and 350 feet of 15-inch pipe having 13 right angle bends. In testing this pipe Captain Manning took these readings:

Pressure at the boiler, 82.52 pounds.

Pressure at the boiler end of 20-inch pipe, 82.36 pounds.

Pressure at the throttle, 78.82 pounds.

RECEIVER

It is seldom we have the opportunity to prove the value of a receiver by installing one after a plant has operated without it. There is one place, and one only, to locate a receiver to obtain all of the best results and that is directly over the throttle.

ENGINE

We will put in a 24 by 54 by 60-inch cross compound Corliss engine, running at 85 revolutions or 850 feet piston speed, with a boiler pressure of 190 pounds and receiver pressure of 18 pounds (gauge pressures), a 26-inch vacuum in the low pressure cylinder and a low terminal pressure of 9.75 pounds absolute, we will obtain 2,000 horse power with a steam consumption of 12.4 pounds per indicated horse power.

Expasion of steam is the success of the compound engine, and with a low receiver pressure you cannot equalize the load. In 1906, a mill I know in Massachusetts threw out a pair of simple condensing engines, and replaced them with a cross compound, looking for increased economy. The coal consumption increased. Looking into the conditions, it was found they were running with a low receiver pressure of 8 pounds, throwing the most of the load on the horse power cylinder, thus destroying the efficiency by reducing the number of expansions.

You will note I placed the vacuum at 26 inches in the cylinder, not at the pump or exhaust pipe. This is a figure seldom reached with reciprocating engines. The success of the turbine is its high vacuum realized by placing the condenser close to the exhaust nozzle. Looking at some steam plants, one might imagine the engine was installed and the condenser placed wherever there was room, regardless of turns or distance.

PRIMARY HEATER

The exhaust of our engine, like the waste gases, is a necessary by-product that can be partially reclaimed with an exhaust heater. This heater must have not less than 1/2 a square foot of heating surface per boiler horse power and the steam must go round the tubes, not through them. Care must be taken not to congest the area of exhaust. Some will ask why put in an exhaust or primary heater when the exhaust of the condenser will heat the feed water to 150°, or in some cases 200°, before going to the economizer. That is too true in a great many cases and where you find it you may be sure the condenser is consuming too much steam. I can cite you a mill where 22,400 pounds of water is going through the heater per hour. This water is raised from 124° to 200°, or 76° by the exhaust of a condenser hooked up to a 700 horse power cross compound engine. How much steam is this condenser using? Twenty-two thousand four hundred multiplied by 76 equals 1,702,400 heat units. One pound of steam at atmosphere contains 1,146 heat units; 1,702,400 divided by 960, or all that we can realize equals 1,773 pounds steam per hour used by the condenser. The engine itself should not use over 9,000 pounds, 1,773 pounds of steam for the condenser is 20 per cent. of the steam used by the engine. Rather a poor investment, still this mill feels proud to know they can raise their feed water to 200° without an economizer.

Too little thought has been given to the steam consumption of a condenser. In purchasing a condenser the builder must guarantee two things, steam consumption and vacuum in inches under normal conditions. The best twin vertical air pump and condenser for our plant would use about 1,850 pounds of steam per hour. Our condenser must not use over 800 pounds per hour, and the only type that does this is one driven by a Corliss engine.

We will provide a closed heater for the exhaust of this condenser.

With a 27 1/2-inch vacuum in the exhaust pipe we should get our feed water in the primary heater to 108°. Feed water leaving auxiliary heater at 142° and through the economizer to the boilers at 230°.

HEATING THE MILL

There is practically no waste in heating a mill with the hot water system, using a turbine circulating pump and live steam coils returning condensation to the boilers. This system should heat a textile mill in any part of Massachusetts for 50 cents per horse power per year. The old style hot water system used a high speed reciprocating engine for circulating. This engine suffered more or less from lack of attention. The turbine is practically fool-proof.

COAL

It is of importance that we make provision for the storage of our coal. The difference between the price of coal in the car or vessel and the price in the fire-room is an item to be considered, and runs up rapidly in the winter.

The nicest way to handle car coal on a 2,000 horse power plant, hand fired, is, if possible, with a spur track run into the yard on a trestle not less than 25 feet high. We have in the past labored under the impression that in storing coal through the winter, especially out in the open, a generous

amount of its value was absorbed by the atmosphere. It is true that inflammable gas, made up chiefly of methane, escapes from coal, some more than others, not only in the mine but a long time after, but investigations and experiments made by the United States Bureau of Mines have shown that the deterioration of high grade coal while in storage is very slight; in friable low volatile coals like "New River" and "Pocahontas," the loss in four or five months is usually less than 2 per cent., and in hard low volatile coals like "George's Creek Cumberland" it is less than one-half of one per cent. They therefore recommend the storage of coal in the open instead of under cover, where there is greater liability of spontaneous combustion. Their exhaustive tests have also revealed the fact that oxygen is just as wasteful an element in coal as ash. In other words, coal showing 6 per cent. ash and 3 per cent. oxygen is no higher in heat value than a coal showing 8 per cent. ash and 1 per cent. oxygen.

BUYING OF COAL

The old style of buying coal by its name is practically dead and should not be thought of by intelligent men, as we all know that poor seams can be found in all coal districts. Different methods have been advised for the purchase of coal, one of which is the B. T. U. basis. This is a beautiful theory, but a practical failure. Heat units should regulate the value or price, but in making a contract there are other elements in coal and conditions of the individual plant to be considered.

OPERATION

We have completed, for $84,000, what we believe to be a first class modern plant for a textile mill, capable of producing the most economical results. It now remains for the operating engineer to bring them out.

Gentlemen, I want to state a few facts with no intention of being disrespectful. You, as textile managers, are not engineers and never will be. This is an age of specialization. To be proficient or masters of a profession one must give his undivided thought and attention to it. You love the sound of the spindle as the engineer does the pulsation of the steam plant, or the heart of the mill. This love is formed by constant association, overcoming daily vexing problems, watching and preventing, if possible, disorders that all things mechanical are heir to. As mill managers you are students of human nature. You have selected, you believe, the best material available as engineer. Hand him the key and demand results.

AN ELECTRIC CONDITIONING OVEN

By HENRY W. BUHLER, 251 Causeway St., Boston

In the textile industry there is need of an accurate and standard conditioning oven. Moisture affects both the strength and commercial values of textiles and its determination is often of great importance. The steadily growing practice of buying and selling textile products upon a standard moisture content requires the use of a conditioning oven that will give comparable results to both buyer and seller. The gas heated and hand regulated type of conditioning oven is not entirely satisfactory and is open to considerable improvement. The use of gas objection for several reasons and hand regulation, requiring more or less constant attention, is prohibitive for accurate work and general use. This paper has been prepared to bring to your attention a new electrically heated and regulated oven which has been designed and constructed by the Emerson Apparatus Company, Boston, Mass.

In the design of this oven special attention has been given to securing accuracy, quickness and ease of manipulation and rapidity of operation. To meet these requirements electricity has been adopted as a heating medium, providing at once safety and sensitiveness of regulation. A uniform temperature is automatically maintained by the use of a thermostat. Provision has been made for testing several samples of material simultaneously and rapidity of operation has been further accelerated by maintaining an artificial circulation of hot air through the oven. The entire apparatus is a self-contained and complete testing unit.

The conditioning oven has already proved its value in the silk, woolen and worsted industries, and if extensively used in the purchase of these materials upon a moisture or net fiber weight basis. It has also a large field of usefulness to the cotton manufacturer in the purchase of his raw material. Cotton is one of the few remaining large and valuable raw products that is not bought upon a standard basis. In nearly all lines of industry manufacturers are purchasing their supplies and materials upon a standard of quality and value, and are seeking to eliminate waste, uncertainty and chance of loss. Payments are made strictly upon value received. The seller or shipper finds it to his advantage to improve the quality of his product, to use greater care in selection and preparation, and to adopt better methods of shipping and handling. General improvement results with profit and saving to both buyer and seller. The cotton manufacturer, however, at present has little or no protection for his enormous investment in cotton, and must pay for everything that he gets.

One of the greatest losses in buying cotton is due to excessive moisture which, by increasing the weight, adds both to the net cost and to the freight and handling charges. Every five pounds of excessive moisture per bale represents a loss of about one per cent. or about one thousand dollars for every two thousand bales of ten cent cotton. This loss falls directly upon the cotton manufacturer. The purchase of cotton upon a standard moisture basis would bring a great improvement and effects a large saving. Payments should be made upon the net fiber weight plus a standard percentage of moisture and rebates obtained for any additional moisture content. This method of buying cotton is already practiced in Europe where nearly two-thirds of the American crop is used. In these days of increasing competition and small profits where every item of expense must be watched to prevent waste such an opportunity for saving cannot be long overlooked. With suitable apparatus at his command the cotton manufacturer in this country should enjoy the same privileges and economies that are given to his foreign competitors.

Personals

James C. Fitzpatrick, of the local branch of the U. S. Finishing Co., Norwich, Conn., who has been in charge of the dyeing department for twenty years, has severed his connection with that company.

Edward M. Taylor has been appointed master mechanic at the Westerly Textile Co., Westerly, R. I. He was formerly employed at master mechanic at the Solway Mills, before they removed their machinery from Westerly.

S. E. Lancaster, superintendent of George W. Davis, Inc., Woolen Mill, Worcester, Mass., has severed his connection with that company.

Turner Rollinson, overseer of dyeing for the Singleton Worsted Co., Franklin, Mass., has severed his connection with that company, after six years of service.

Robert Illingworth, superintendent of the Woodside Woolen Co., Northboro, Mass., has resigned to accept a similar position with George W. Davis, Inc., Worcester, Mass.

Lees Hall has accepted the position as overseer of dyeing at the Marston Worsted Co., Skowhegan, Me. He was formerly dyer at this mill.

CHAS E. LEIPPE, THE NEW PRESIDENT OF THE NATIONAL ASSOCIATION OF HOSIERY AND UNDERWEAR MANUFACTURERS

Charles Burdick has accepted the position as second hand in the carding department at the Dwight Mfg. Co., Chicopee, Mass. He comes from the Whitman Mills, New Bedford, Mass.

J. R. Penley, formerly at the Brander Mfg. Co., Concord, N. C., has succeeded G. H. Lowder as night overseer of weaving at the Fidelity Mfg. Co., Charlotte, N. C.

W. A. Black, superintendent of the Pomona Mill, Greensboro, N. C., has resigned.

H. A. Vanpatten has accepted the position as overseer of weaving at the Echota Mills, Calhoun, Ga. He comes from Aragon, Ga.

James Gates has accepted the position as overseer of carding at the Fort Mill Mfg. Co. No. 1 Mill, Fort Mill, S. C., having formerly held a similar position with the No. 2 Mill.

Edmond M. Brown has accepted the position as designer at the Continental Worsted Co., Providence, R. I. He was formerly designer at the Paragon Worsted Co., same city.

John Hughes, overseer of carding at the Faulkner Mfg. Co., North Billerica, Mass., has severed his connection with that company.

W. N. Darby has accepted a position as overseer of carding at the Panola Mill, Greenwood, S. C. He formerly held this position.

J. H. Garrett has accepted the position as overseer of carding at the Walton Mill, Monroe, Ga., succeeding W. N. Darby. He comes from Eufaula, Ala.

George H. Bramwell has accepted the position as overseer of spinning at the Locustville Woolen Co., Hope Valley, R. I.

Edward King, overseer of carding at the Locustville Woolen Co., Hope Valley, R. I., has severed his connection with that company.

Captain Walter F. Page, for nineteen years yard master at the Bigelow Carpet Co., Clinton, Mass., has concluded his services with the company to accept a position at Newtonville, Mass.

Charles M. Holmes, treasurer of the Holmes Mfg. Co., New Bedford, Mass., has been elected president of the Textile Club of Manchester, N. H.

Edward Morris, who has been second hand in the carding department at the No. 2 Wamsutta Mill, New Bedford, Mass., has been appointed second hand at the No. 6 mill.

Thomas Morrison, overseer of spinning at the Hadley division, American Thread Co., Holyoke, Mass., has severed his connection with that company to accept a similar position at Fall River, Mass.

Fred Wilkinson, general second hand in the carding department at the Wamsutta Mill, No. 6, New Bedford, Mass., has severed his connection with that company. He has accepted a similar position with the Kilburn Mill.

J. E. Allen has accepted the position as overseer of spinning at the Hadley division, American Thread Co., Holyoke, Mass. He comes from Three Rivers, Mass.

H. W. Fitzroy, overseer of finishing at the Plainfield Woolen Co., Central Village, Conn., has severed his connection with that company.

Joseph M. Gannon has accepted the position as overseer of carding at the Faulkner Mfg. Co., North Billerica, Mass. He has been in the employ of this company for nearly twenty years as second hand under John Hughes, who recently resigned as overseer.

F. H. Doyle has accepted the position as assistant superintendent and designer at the Concord Mfg. Co., Penacook, N. H. He was formerly employed at the Mayo Woolen Co., Millbury, Mass.

James A. Fagan has accepted the position as overseer of finishing at the Akela Mill, Pascoag, R. I. He comes from Mapleville, R. I.

David Rennie, overseer of the dressing department at S. Slater & Sons' woolen department, Webster, Mass., has severed his connection with that company and will sail for his home in Scotland on May 28th.

Henry L. Stewart, overseer of finishing at the Akela Mill, Pascoag, R. I., has severed his connection with that company.

A. W. Wilmont has accepted the position as overseer of weaving at the Hamilton Mfg. Co., Lowell, Mass. He was formerly employed at Newburyport, Mass.

T. B. Umpleby, superintendent and designer for J. A. Humphrey & Sons, Ltd., Moncton, N. B., Canada, has severed his connection with that company.

George Fairgrieve, overseer of finishing at J. A. Humphrey & Sons, Ltd., Moncton, N. B., has resigned to accept a similar position with the Horn Bros. Ltd., Woolen Co., Lindsay, Ont., Canada.

Charles Shires has been appointed superintendent and designer at the Oxford Mfg. Co. Ltd., Oxford, N. S., Canada.

E. N. Tillinghast has succeeded Charles L. Kenyon as manager of the Wyoming Yarn Co., Wyoming, R. I. Mr. Tillinghast will act as general manager.

Daniel Welsh has accepted the position as overseer of finishing at the H. T. Murdock & Co.'s mill, Proctorsville, Vt. He comes from the Verd Mont Mill, Ludlow, Vt.

J. F. Brown, overseer of carding for Smith & Cooley, Stafford Springs, Conn., has severed his connection with that company. Mr. Brown has been in their employ for over 25 years. He was formerly engaged at Uxbridge, Mass.

John Wolstenholme, superintendent of the Oxford Mfg. Co., Oxford, N. S., Canada, has accepted the position as superintendent and designer for J. A. Humphrey & Sons, Ltd., Moncton, N. B., Canada.

Albert Remington has accepted the position as overseer of dyeing at the Singleton Worsted Co., Franklin, Mass. He was at one time employed at the Wuskanut Mills, Farnumsville, Mass.

James Winning has accepted the position as overseer of carding for Benjamin Hey & Co., Cincinnati, O. He comes from Lawrence, Mass.

M. J. Boland has accepted the position as overseer of dyeing for the E. E. Hilliard Co., Buckland, Conn. He comes from Somersworth, N. H.

Adolph Zeigler has accepted the position as overseer of spinning at the Garland Woolen Co., Staffordville, Conn. He comes from Rockville, Conn.

George E. Barlow, formerly with the Piedmont, Ala., office of the Coosa River Spinning Co., has been elected secretary and treasurer of the Atlantic and Gulf Mills, Quitman, Ga.

Frank H. Goettler has accepted the position as second hand in the dye house at the Assabet Mills, Maynard, Mass., succeeding Clarence Broadbent.

Clarence Broadbent has accepted the position as overseer of dyeing at the Burlington Mills, American Woolen Co., Winooski, Vt. He comes from the Assabet Mills, Maynard, Mass., where he held a position as second hand of dyeing.

W. J. Austin has accepted the position as overseer of carding at the Green River Mfg. Co., Tuxedo, N. C.

Sam Leach has accepted the position as designer at the Narragansett Worsted Co., North Oxford, Mass. He was formerly employed at the Lymansville Co., Lymansville, R. I.

Clifford Costine, designer at the Stanley Woolen Co., Uxbridge, Mass., has resigned to accept a position as assistant superintendent and designer at the Yantic Woolen Co., Yantic, Conn.

Thomas H. Conley has been appointed superintendent of the New York Mills, New York Mills, N. Y. He was formerly employed at the Mohawk Valley Cotton Co., Utica, N. Y.

Leonard H. Mellor has accepted the position as overseer of mule spinning at the Butler Mill, New Bedford, Mass. He was formerly employed at the Booth Mfg. Co., same city.

John S. Robinson has accepted the position as overseer of carding at the North Adams Mfg. Co., North Adams, Mass. He comes from Coscob, Conn., a position which he formerly held.

John C. Ewen has been appointed superintendent of the Rockville Worsted Co., Rockville, Conn., succeeding T. J. Corcoran, Jr. This company has given their help a 7 1/2 per cent. increase in wages.

Robert Hutton, designer at the Oakland Mfg. Co., Reistertown, Md., has severed his connection with the company.

Miss S. Stevenson, for the past three years forelady of the finishing department of the Zimmerman Mfg. Co., Hamilton, Ont., Canada, has accepted a similar position with the Watson Mfg. Co., Brantford, Ont.

F. P. Gallagher has accepted the position as overseer of finishing at the Plainfield Woolen Co., Central Village, Conn. He comes from the Paragon Worsted Co., Providence, R. I.

C. W. Everett has accepted the position as overseer of weaving at the Concord Mfg. Co., Penacook, N. H. He comes from Burlington, Vt.

Charles G. Petzold, designer at the Atlantic Mills, Providence, R. I., for a number of years, has severed his connection with that company.

D. O'Connell, proprietor of the Bay State Worsted Co., Worcester, Mass., has assumed the position of manager of the Elmville Worsted Co., Elmville, Conn., in addition to his other duties.

C. H. Cromer has accepted the position as overseer of weaving at the Alexander City Cotton Mills, Alexander City, Ala. He comes from Atlanta, Ga.

E. L. Bost has been promoted from the position of second hand in the dyeing department to overseer of that department at the Wiscassett Mills, Albemarle, N. C.

F. A. Johnson has accepted the position as overseer of dyeing at the Erwin Mills, Cooleemee, N. C.

W. A. Childers has been promoted from overseer of weaving to superintendent of the Entwistle Mill, Rockingham, N. C.

J. W. Cannady has been promoted from sectionhand to overseer of night carding at the Highland Park Mill No. 3, Charlotte, N. C.

A. M. Turner has accepted the position as overseer of carding at the Brander Mill, Concord, N. C. He comes from Palmetto, Ga.

P. M. Keller has accepted the position as overseer of carding and spinning at the Dillon Cotton Mills, Dillon, S. C.

A. M. Ballard has accepted the position as overseer of the cloth room at the Avon Mills, Gastonia, N. C.

W. T. Brown has accepted the position as overseer of weaving and cloth room at the Panola Mill ,Greenwood, S. C.

E. D. Wolfe has accepted the position as overseer of carding at the Arista Mills, Winston-Salem, N. C. He comes from Pries, Va.

Frank Morris succeeds Frank Carr as overseer of spinning at the Corr Mfg. Co., Taunton, Mass. He comes from Fall River, Mass.

L. C. Hollingworth, superintendent of the Namquit Worsted Co., Bristol, R. I., has severed his connection with that company. He is succeeded by John F. Dunn, who has been designer for this company.

Albert A. Fournier has accepted the position as overseer of carding at the Renfrew Mfg. Co., Adams, Mass. He comes from Lowell, Mass.

Thomas Warbottom, overseer of carding at the Page Mfg. Co., New Bedford, Mass., has resigned to accept a similar position with the Warren Mfg. Co., Warren, R. I.

George Fish, general superintendent of the New York Mills, New York Mills, N. Y., has tendered his resignation. He has made no plans for the future.

J. H. Barnett, superintendent of the Elmville Worsted Co., Elmville, Conn., has resigned. He will retain the position of secretary and will remain on the Board of Directors.

F. D. Blackmore, formerly engaged in the laundry and tailoring business in Chicago and Indianapolis, is the latest addition to the sales force of the United States Hoffman Co. of Syracuse, N. Y. He will represent this firm in Chicago, Wisconsin and Minnesota.

Jere Busby, overseer of finishing at the Sayles & Jenks Mfg. Co., Warren, Mass., has severed his connection with that company.

F. W. Birkenshaw has accepted the position as overseer of finishing at the Sayles & Jenks Mfg. Co., Warren, Mass. He comes from the Aetna Mills, Watertown, Mass.

Leslie J. Moosman, purchasing agent at the Grant Yarn Co., Fitchburg, Mass., has tendered his resignation to accept the position of treasurer of the Barrington Mill, Great Barrington, Mass.

Eugene J. Bourque has accepted the position as overseer of spinning at the Fabyan Woolen Co., Medway, Mass. He was formerly employed in Hope Valley, R. I.

R. G. Henderson, resident agent of the Assawaga Co., Dayville, Conn., has tendered his resignation. He has made no plans for the future.

T. J. Rogers, overseer of dyeing for the E. E. Hilliard Co., Buckland, Conn., has severed his connection with that company.

Louis Carmack, overseer of dyeing at the Lymansville Co., Lymansville, R. I., for a number of years, has resigned and is succeeded by Charles Attridge.

F. D. Glazier, who retired from active management of the Glazier Mfg. Co., South Glastonbury, Conn., two years ago, has again taken active interest in the management of the company.

E. C. Gwaltney, superintendent of the No. 1 and 2 mills of the New York Mills, New York, N. Y., has been appointed general superintendent to succeed George Fish, who recently resigned.

J. A. Middlebrook, manager of the Talbot Wool Combing Co., Norton, Mass., has severed his connection with that company. He contemplates starting in business for himself.

J. P. Hanley has accepted the position as overseer of spinning at the Saxtons River Woolen Co., Saxtons River, Vt. He comes from Franklin, N. H.

E. A. Gale has accepted the position as overseer of carding at the Saxtons River Woolen Mills, Saxtons River, Vt. He comes from Bloomsburg, Pa.

Thomas Brennan has accepted the position as overseer of dressing at the Huntington Mfg. Co., Huntington, Mass. He was formerly employed at the Pawcatuck Woolen Co., Potter Hill, R. I.

Ernest Hill has accepted the position as overseer of spinning at the Cheshire Mills, Harrisville, R. I. He comes from the Saxtons River Woolen Co., Saxtons River, Vt.

Theo P. Talpey has accepted the position of superintendent of the bleachery of the Exeter Mfg. Co., Exeter, N. H. He comes from Passaic, N. J.

John Hacking has been appointed superintendent of the Summers Linen Co., Port Huron, Mich.

Arthur Tidd has accepted the position as overseer of spinning at the Robinson Mills, South Windham, Me. He comes from Waterville, Me.

Robert Hall, overseer of weaving at the Iroquois Mill, Saugus, Mass., has severed his connection with that company.

Abraham Mellor has accepted the position as designer at the Elm Worsted Co., Elmville, Conn.

Fred Holland, overseer of burling and sewing at the Perseverance Worsted Co., Woonsocket, R. I., has severed his connection with that company to accept a similar position in one of the large mills in Philadelphia.

James Hirst has accepted the position as overseer of weaving at the Jefferson Mfg. Co., Jefferson, Mass.

Gardner D. Gibbs, overseer of carding at the Warren Mfg. Co., Warren, R. I., for several years has severed his connection with that company.

George LaBell has been appointed overseer of carding at the Page Mill, New Bedford, Mass. He formerly held the position of second hand at this mill. John R. Waldron has been promoted from third hand to second hand in this department.

Thomas Warburton, overseer of carding at the Page Mill, New Bedford, Mass., has severed his connection with that company. On his retirement he was presented with a gold watch, chain and Masonic charm by the help in the carding room. He has accepted a similar position with the Warren Mfg. Co., Warren, R. I.

W. E. Baggott, formerly of Huntsville, Ala., has succeeded J. C. Byrd as overseer of carding at the Lincoln Cotton Mills, Evansville, Ind.

T. T. Goins has accepted the position as overseer of spinning at the Arkwright Mills, Spartanburg, S. C.

W. T. McVaskee has accepted a position as overseer of carding at the Entwistle Mills, Rockingham, N. C.

I. W. Wright, of Liberty, S. C., has been appointed superintendent of the Lydia Mills, Clinton, S. C.

J. E. Shaw has accepted the position as overseer of carding at the Clinton Cotton Mills, Nos. 1 and 2, Clinton, S. C. He comes from Rockingham, N. C.

K. C. McCollum has been promoted from second hand to overseer of the cloth room and assistant superintendent at the Lockhart Cotton Mills, Lockhart, S C.

J. B. Morris has accepted the position as overseer of knitting at the Freeze Hosiery Mill, Hendersonville, N. C.

DEATHS.

M. C. D. Borden, president of the American Printing Co., and the Fall River Iron Works of Fall River, Mass., also senior member of the firm of M. C. D. Borden & Sons, Worth St., New York City, and one of the pioneer print cloth manufacturers of America, died at Oceana, N. J., on May 27, after a lingering illness. Mr. Borden was educated at the Phillip Academy, Andover, Mass., and at Yale College from which he graduated in 1864. He first entered a dry goods jobbing house in New York City as stock boy and was advanced to various positions. In 1871 he became a member of the firm of Low, Harriman & Co. and when the account of the American Printing Co. was transferred to Wright, Bliss & Fabyan, Mr. Borden associated himself with the last named firm as manager of the account. On July 1, 1910, the firm of M. C. D. Borden & Sons was organized to sell the products of the American Printing Co. direct. Mr. Borden has been for years an important factor in the cotton goods trade. He showed the highest ability as a merchant and on numerous occasions demonstrated his courage and shrewdness in operations in the cotton goods trade. He was connected with many charitable movements. A widow and seven sons survive him.

Anton J. Quanz, treasurer of the Dundee Textile Co., Passaic, N. J., died at his residence in New York City, April 25, at the age of 47 years. He was one of the best informed men in the silk business in the United States, and his genial disposition and noble character endeared him to a host of friends.

Charles S. Chapman, one of the most prominent business men of Rochester, Mich., died May 5 at the Pontiac State hospital, where he was removed three weeks ago, when his condition became serious. Mr. Chapman was at the head of the Western Knitting Mills, vice-president of the First National Bank, and a member of the Robbins Lumber Co. He also held extensive lumber interests in Wisconsin. Mr. Chapman was formerly connected with the Detroit Knitting Co., but later moved to Rochester, where he started the Western Knitting Mills. A widow and two children survive him.

J. W. Brown, superintendent of the American Textile Co. Cotton Mills, at Atco, Ga., died suddenly on Monday, April 29, 1912. Mr. Brown was in his usual good health and while attending a K. of P. banquet left the hall, complaining that he was too warm. He started home and while seated in his buggy, before starting, was stricken with heart failure and peacefully passed away in about ten minutes. A short funeral service was held at his home in Atco, Tuesday afternoon, at 4 o'clock, Rev. L. G. Hames, pastor of the First Presbyterian Church, officiating. The remains were interred at his old home, West Point, Ga. Mr. Brown was born at Paterson, N. J., 58 years ago, spending the earlier years of his life in that place. When a young man he came to West Point, Ga., and was for a number of years with the West Point Machine Works. From West Point he went to Dalton, Ga., where he superintended the Crown Cotton Mills for many years. Mr. Brown came with the American Textile Co.'s mill at Atco in 1904, when the mill was started, and has been its superintendent from that time until his death. His wife and four sons, also two daughters survive him. The mill was closed Tuesday and Wednesday as a tribute to his memory. Mr. Brown was beloved alike by his associates in the management and the employes of the corporation. He also was prominent in mill circles in the South and had long been known as a successful manufacturer.

Samuel J. Emerson, for many years a prominent manufacturer of cotton and woolen goods, died at Lunenburg, Mass., at the age of 63 years. He was associated with his father in the manufacture of textile goods under the firm name of Jason, Emerson & Son, with mills located in Massachusetts and Connecticut. He was not actively engaged in manufacturing for the past few years.

Sam Driver died at Westboro, Mass., on May 4th after a long illness. Mr. Driver was one of the best known woolen carders in the United States. He was born in England where he learned his trade and worked in many of the carded woolen mills of the United States as overseer of carding during a period of over forty years. For a number of years he acted as consulting expert, in which capacity he aided many woolen mills in overcoming difficulties in their carding department. For a number of years he has been in poor health. Mr. Driver is especially well known to the readers of this magazine owing to his series of articles giving personal experiences published some years ago.

Henry M. Witter, Jr., agent of the H. M. Witter & Co., Park Ave., Worcester, Mass., manufacturers of tapes, braids, edgings, etc., committed suicide at his home in that city on May 12 by shooting himself. Business troubles is thought, by his family and friends, to have caused the deed. He is survived by a wife, formerly Miss Maud Sutton, also an aged father and one brother.

Thomas Wright, a well known inventor of machinery used in the manufacture of textiles, died at his home in Rochester, N. Y., at the age of 70 years. Mr. Wright was the son of Dr. John Wright, a well known physician of Nottingham, Eng. At the time of his death he was perfecting a loom based on a new principle which he hoped to complete in a short time.

L. Alexander Jennings, a former overseer of carding at the Bennett and Grinnell Mills, New Bedford, Mass., died at his home, May 14, at the age of 63 years. He had been in poor health for some time and is survived by three daughters, having lost his wife about three years ago.

Leonard Morley has been appointed superintendent of the British Hosiery Co., Thornton, R. I.

Benjamin Franklin Mellor, president and manager of the Standish Worsted Co., Plymouth, Mass., died at the Milford, Mass., hospital on May 20, following an operation, at the age of 59 years. Mr. Mellor had been enjoying good health until about three months ago. He was a member of many lodges and was considered an expert in the manufacture of worsted goods. A widow, three daughters and one son survive him.

Mill News

Those interested in receiving early and more complete investigated information of projected new mills, enlargements, improvements, fires, facts and gossip of the trade are referred to the TEXTILE ADVANCE NEWS, issued weekly by the publishers of the TEXTILE WORLD RECORD, at $15.00 per year.

COTTON.

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New Mills.

*Canada, Quebec, Three Rivers. The Saint Maurice Valley Cotton Mills, Ltd., previously reported incorporated under Montreal with capital stock of $1,250,000, will manufacture fine white cottons on 900 looms. A plant will be erected adjoining the property of the Wabasso Cotton Co., Ltd., Three Rivers, and the two plants will be operated under the same management. Correspondence should be addressed care of the Wabasso Cotton Co., Ltd., Three Rivers, Quebec.

*New York, Lockport. Articles of incorporation have been filed by the Clifford Textile Co., which it was reported in April would be organized to manufacture linen and union towels and crashes, making a specialty of lettered goods. The capital stock is $40,000, consisting of 400 shares of $100. The incorporators are James Clifford, 200 shares; Mary A. Clifford, 100 shares; Anna J. Clifford, 10 shares; Margaret C. Deford, 10 shares; James E. Clifford, 10 shares, and John F. Clifford, 10 shares. The Cliffords own the mill occupied by the Lockport Textile Co. and will equip it with 24 looms at first, gradually increasing to 150 looms.

*North Carolina, Bladenboro. Construction contracts have been awarded by the Bladenboro Cotton Mills, recently incorporated with capital stock of $300,000. The main building will cost $40,000 and will be of brick construction, 103 ft. wide by 420 ft. long. A 450 h. p. steam power plant will be built. Machinery contracts for an 8-000-spindle hosiery yarn plant have been awarded.

*North Carolina, Charlotte. Chas. W. Johnston, president of the Highland Park Mfg. Co., has purchased a site for his proposed new 5,000 spindle cotton yarn mill. Plans and specifications for building are being prepared.

*North Carolina, Concord. Officers have been elected by the new Louis Mfg. Co. as follows: John C. Rankin of Lowell, N. C., president; P. M. Keller, Concord, vice-president; Louis Braun, Concord, secretary and treasurer. Plans have been prepared for a brick mill, 75 by 160 ft., to be equipped with 2,000 spindles and driven by electric and water power. In earlier reports it was noted that this company would take over the property of the Roberta Mfg. Co., which was burned out over a year ago.

Pennsylvania, Philadelphia. George F. Briscow & Son have leased the one-story annex to the O'Neill Mills, at Oxford and Josephine Sts., Frankford, and are installing 10 broad looms on which they will manufacture upholstery and michelline fabrics, selling the production direct, and buying cotton, mercerized and silk yarns.

Enlargements and Improvements.

Alabama, Anniston. A further enlargement of the plant of the American Net & Twine Co. will be made by the construction of a new warehouse of 3,000 bales' capacity. Contracts have been awarded.

Alabama, Prattville. It has practically been decided to bring the Prattville Cotton Mills up to date in every respect and to build another warehouse. According to reports, the changes will include the installation of a large amount of new machinery equipment. Osnaburgs, sheetings, duck and rope are manufactured on 12,000 ring spindles and 290 narrow looms. M. A. Graham is secretary, treasurer and buyer and D. E. Edwards is superintendent.

Alabama, Shawmut An increase of 5,000 spindles is to be made at the Shawmut Mills of the West Point Mfg. Co., West Point, Ga., manufacturing duck on 30,000 spindles and 300 looms.

Alabama, Talladega. New winding machinery has been ordered by the Highland City Mills.

*Canada, Nova Scotia, Yarmouth. Work is to be started soon on enlargements to the plant of the Cosmos Cotton Co. It has been noted previously that 8,000 spindles and 180 looms will be installed, giving a total equipment of 20,000 spindles and 183 looms. G. H. Allen is treasurer, agent and buyer. Cotton duck is manufactured and sold through J. Spencer Turner Co., New York.

*Georgia, Conyers. A small addition is under construction at the Milstead Mfg. Co.'s plant to provide space for the increase previously reported. Six hundred twelve additional spindles and 10 additional looms are to be installed. They manufacture heavy duck. Fuller E. Callaway is president; F. J. Callaway, manager and buyer, and O. D. Grimes, superintendent.

Georgia, Newnan. The McIntosh Mills will change from steam to electric power some time before October 1. Cotton yarns are manufactured. Guy Garrard is secretary, treasurer and buyer.

*Maine, Lewiston. Work has been started in a preliminary way on the extensive enlargements planned by the Bates Mfg. Co. and it is stated that if nothing unforeseen happens construction work will be started on the proposed new weave shed inside of a month. It has not been fully decided whether to build of brick or cement. It will be remembered that the Bates Mfg. Co. has plans for adding approximately 75,000 spindles and 2,000 looms, and to house this equipment a new weave shed with approximately 4 1/2 acres of floor space and an addition 5 stories high, 100 ft. square, will be built. It will also be necessary to develop additional power. It cannot be stated definitely that

the company will do anything along the lines of making the proposed enlargements this year, but it is reasonably certain that they will. Hartley L. Lord is agent. Bliss Fabyan & Co. are the selling agents.

*Massachusetts, Lowell. Preliminary work is to be started on the new 5-story mill for the Appleton Co. before the middle of this month and the enlargement will be completed about November 1. It has been noted previously that all departments will be increased.

Massachusetts, Lowell. Plans for an addition to the Lowell Weaving Co. are under way which will call for a 2-story mill probably 150 ft. long to be erected at the north end of the present building. A new boiler is being installed to take the place of the old boiler. While the changes are being made the plant is being operated by electric power. All departments are running to full capacity and the proposed addition is necessary to take care of the growth of the business. This is one of the mills of the Bay State Cotton Corp., Boston, and manufactures automobile tire fabrics and high grade sail cloths. P. T. Jackson, Jr., of the Bay State Cotton Corp. is the buyer.

Massachusetts, Whitinsville. The Uxbridge Cotton Mills, located at North Uxbridge, plan to erect a new office building to take the place of the present inadequate offices.

*Mississippi, Stonewall. The new dye house under construction for the Stonewall Cotton Mills will be equipped to do raw stock dyeing and bleaching. The dyeing equipment will be installed first as they do not expect to bleach until the dyeing department is in good running order, but they are providing space for the bleaching equipment. The exact class of goods they will make when the improvements are completed has not been determined and they will continue for a time at least to make plain white goods. The capital stock of this company is $400,000. T. L. Wainwright is president, treasurer and buyer, and J. L. Davidson is superintendent. The plant contains 21,000 ring spindles and 475 looms and is operated by steam power.

New Hampshire, Manchester. A 2-story addition will be built on No. 1 Mill of the Stark Mills to measure 58 by 58 ft., and will be completed in about two months. The new space will be equipped for twisting and bleaching.

*North Carolina, Greensboro. Ninety-eight looms are being installed in the White Oak Cotton Mills of the Proximity Mfg. Co., which with the 1,902 looms already running will complete the equipment of this mill, rounding it out to 2,000 looms.

*North Carolina, Marion. It has been decided by the directors of the Marion Mfg. Co. to build an extension which will provide space for 22,000 spindles and 544 looms and contracts for the construction work have been awarded. The new manufacturing space will not be wholly filled up with machinery at present. J. E. Sirrine of Greenville is the architect-engineer.

North Carolina, Rockingham. On the opposite side of the creek from the present mill the Ledbetter Mfg. Co., owners of the South Union Mills, will have erected a new mill building, 2 stories high, 75 by 150 ft. The company manufactures 2 and 3 ply yarns in low counts on 2,736 producing spindles and 1,248 twisting spindles. T. B. Ledbetter is president and treasurer; H. D. Ledbetter, secretary and buyer, and D. L. Culberson is superintendent.

*North Carolina, Rockingham. An addition is being built to the plant of the Pee Dee Mfg. Co. in which preparatory machinery, 2,800 spinning spindles and 136 box looms will be installed. Plaids and shirtings are manufactured.

*North Carolina, Wilson. A small addition is being erected to the Wilson Cotton Mills to provide space for new twisters and reels that have been ordered. New lappers and cards also have been contracted for to replace the old equipment. Recently this company was reorganized with S. A. Woodard, president; F. L. Carr, treasurer, and E. A. Holt, superintendent. 1/12 and 2/20 warps and skeins are manufactured on 6,240 ring spindles.

Pennsylvania, Philadelphia. F. W. Maurer & Sons Co., manufacturers of window shade trimmings at Wayne Ave. and Bristol Sts., Nicetown, and narrow fabrics and tapes at the same address, have increased their equipment in both mills to 100 looms each.

Pennsylvania, Philadelphia. Whitely & Collier, now located in the rear of the Oriental Mills at 55th and Wyalusing Ave., have increased their equipment to 30 looms on which they are manufacturing curtains and drapery materials which they are selling direct and through New York.

Pennsylvania, Philadelphia. The Delta Spinning Mills, Frankford, spinners of combed Egyptian, peeler and mercerized yarns, with 10,000 ring, 10,000 mule and 4,000 twisting spindles, W. R. Garsed, superintendent, are now sold up and arranging to start on a day and night schedule with two sets of hands. New cone winding machines have recently been installed for the purpose of enlarging this department.

*Rhode Island, Providence. Good progress is being made on the extensive enlargements and improvements at the Harris Mill of the Interlaken Mills. A detailed report of these additions has been given previously.

*Rhode Island, Westerly. The Westerly Textile Co., recently organized as noted to manufacture mosquito netting and simular goods, are removing the old boilers from the mill on Main St. which they have acquired, preparatory to installing a new steam plant. Fred E. Fowler, formerly secretary of the I. E. Palmer Co., Middletown, Conn., heads the new company. It is expected manufacturing will be started about July 1.

*South Carolina, Chester. Over $250,000 has been expended in enlargements and improvements at the Wylie Mills, changing the plant from a yarn mill to a fancy cloths mill. It is one of the 16 mills controlled by the Parker Cotton Mills Co. of

Greenville. The directors have called a meeting of the stockholders to be held shortly to consider liquidating and it will probably be merged with some of the other mills of this group under the style of the Hampton Cotton Mills, as reported last week.

*South Carolina, Fairmont. One hundred and forty more looms in the plant of the Fairmont Mfg. Co. are being equipped with dobby heads to weave fancy goods. There are no other changes being made at this time and this installation of dobbies changes their entire equipment from plain to fancy work. About a year ago 200 dobbies were installed.

*South Carolina, Greenville. About two weeks will be required for the completion of the addition to the dye house of the Camperdown Mills. They are adding 1,500 new spindles.

*South Carolina, Liberty. Additional equipment, including 3,072 ring spindles with preparatory machinery, is being installed in the Maplecroft Mills. Early reports of this enlargement were given.

South Carolina, Lockhart. The Lockhart Mills have engaged I. W. Jones of Milton, N. H., to engineer the development of water power on Broad River and to have charge of the construction of a dam.

Tennessee, Knoxville. At a recent meeting of the directors of the Brookside Mills it was decided to build an addition to the plant and install about 200 looms, also to make some minor changes. Contract will be awarded within the next few days and the looms will be installed as soon as the building is completed. Corduroy, velvets, ducks and specialties are manufactured.

*Virginia, Danville. Work will be started shortly on a 4-story addition, 50 by 75 ft., for the Riverside & Dan River Cotton Mills. It has been noted previously that 800 automatic looms, 10,000 spindles and preparatory equipment would be added.

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Mills Starting Up.

Georgia, Dublin. As noted previously, the Georgia Cotton Mills have been taken over by the Eastman Cotton Mills of Eastman, Ga. The plant will be operated under the style of the Oconee River Cotton Mills on brown cotton sheetings with equipment of 8,000 spindles and 220 40-in. looms. The officers will be the same as those of the Eastman Cotton Mills, that is, W. N. Lietch, president; C. H. Peacock, treasurer, and S. C. Smyly, secretary and general manager.

*Georgia, Griffin. A supply of cotton has been purchased by the Georgia Cotton Mills which succeed the Spalding, Boyd-Mangham and Central Mills and probably the Boyd-Mangham plant will be in operation within a few days. The Spalding mill is ready to start, but some little time will elapse before the Central plant is ready to resume manufacturing.

*Maine, Richmond. The Richmond Yarn Mills, formerly the Richmond Mills Co., have begun manufacturing and are making combed Egyptian and Peeler yarns, 1s to 30s, in single and ply. The new company has capital stock of $100,000. Wm. T. Maher, 176 Federal St., Boston, is president and selling agent and F. C. Haskell is treasurer and manager.

Massachusetts, Newburyport. The American Textilose Co. is just starting to manufacture and the Bay State Cotton Corp., who control the company, advise that the equipment consists of 3,000 "Textilose" spindles and 20,000 ring spindles for manufacturing 10s to 30s, S. I. and Egyptian yarns, "Textilose" yarns and cloth. The capital stock of the company is $1,000,000. Robt. M. Donaldson is president and treasurer and Manning Emery, Jr., is treasurer, superintendent, agent and buyer. Three hundred hands will be employed when the mill is running in full. The Boston Yarn Co. will sell the output. About a year ago this new company bought the Peabody Mfg. Co.'s plant and since that time has carried on extensive alterations and experiments along the line of the new products.

New York, Pike. About a week ago a new company known as the Genesee Textile Co. was incorporated with capital stock of $35,000. This concern will take over the business of the Textile Specialty Co. of Pike, June 1, manufacturing cotton plush specialties on 6 broad and 2 narrow looms. L. A. Mason, treasurer and superintendent of the Textile Specialty Co., will continue as superintendent and buyer of the new concern. The plant has been idle for about six weeks, but will resume manufacturing June 1.

North Carolina, Neuse. The Neuse Mfg. Co., a new company which has taken over the Neuse River Mills, is running the plant on full time. This concern was recently incorporated. The plant contains 8,000 ring spindles and 256 looms, making drills and sheetings.

*North Carolina, Stubbs. A charter has been granted the Buffalo Mfg. Co. with capital stock of $100,000. Chas. C. Blanton, Z. C. Mauney and others of Shelby, and J. L. Mull of Connellys Springs, N. C., are the incorporators. Messrs. Blanton and Mull were large creditors of the old Buffalo Mfg. Co. and purchased the plant at the sale about a year ago. It has been noted previously that Mr. Mauney would be superintendent of manufacturing.

Rhode Island, Pawtucket. On May 1 the Crown Mfg. Co., organized a little less than a year ago, began manufacturing combed peeler and Egyptian 30s to 60s single and ply, also combed and carded sliver and rovings for the woolen trade. A plant has been constructed and equipment installed. This company has capital stock of $400,000. Lyman B. Goff is president; Edward E. Leonard, treasurer, and B. C. Chace, Jr., manager and buyer.

WOOLEN.

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New Mills.

*Maine, Corinna. The new Corinna Mfg. Co. will build a woolen mill of 6-set capacity and manufacture woolen goods, starting with 2 sets of cards. The kind of goods to be made has not

been fully decided. Plans are now in preparation and contracts will be let as soon as they are completed. The capital stock is $50,000. J. H. Winchester has been elected president and John E. Gray, a local hardware dealer, treasurer and buyer. The stockholders are largely farmers in this vicinity.

Pennsylvania, Philadelphia. W. P. McMaster, formerly superintendent of Greer's Emerald Mills in Frankford, has leased quarters in the Megowan Mills at Adams Ave. and Church St., Frankford, in which he has installed 12 broad looms on which he will manufacture woolen and worsted fabrics.

*Pennsylvania, Philadelphia. Last week it was reported that R. T. Foulke, at one time in the carpet business at Coral and Adams Sts., and J. Y. Hogg, recently superintendent of the N. K. Regar Mfg. Co., had formed a partnership for the starting of a plant for the manufacture of fine worsted fabrics and would begin operations with 6 looms, ultimately increasing to 32 looms. Messrs. Foulke and Hogg have applied for a charter under New Jersey laws for the Cambridge Worsted Co. and will locate on Phillip St., above Columbia Ave., in the Ontario Mills. Fine men's wear worsteds will be made.

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Enlargements and Improvements.

Connecticut, Elmville. The Elmville Worsted Co. is to install 16 looms in its plant. This concern recently began operations in the old Thistle Worsted Co.'s plant and is manufacturing fancy worsteds, overcoatings and serges.

Connecticut, Rockville. Six new looms are to be installed by the Rockville Worsted Co. which will give a total equipment of 60 broad and 4 narrow looms. Edmond Corcoran is president, treasurer and buyer, and J. C. Ewen, superintendent.

Connecticut, Stafford Springs. A new carbonizing and drying machine have been installed by the Warren Woolen Co.

*Maine, Camden. Construction work will be started at once on the proposed addition to the plant of the Knoxville Woolen Co. and equipment will be installed and manufacturing started in from four to five months. C. W. Babb is treasurer, superintendent and buyer. Paper makers' felts and woolen specialties are manufactured on 9 sets of cards and 44 looms.

Massachusetts, Millbury. A strip of land on Canal St. has been purchased by Henry O. Sutcliffe, treasurer of the Manufacturers' Wool Stock Co., whose plant at Sutton was burned some time ago, for a consideration of $2,000. The land contains about half an acre and the Manufacturers' Wool Stock Co. will rebuild on the site. Mr. Sutcliffe when interviewed stated that definite plans regarding the mill had not been completed, but a structure about 40 by 80 ft. would be built, similar to the old plant.

Massachusetts, Quinapoxet. Taylor & Bell, manufacturers of satinets and piece dyed woolen goods, have received 28 new looms which will be set up as fast as possible.

Massachusetts, Rochdale. A sprinkler system is to be installed in the Rochdale Woolen Mills of the American Woolen Co.

Massachusetts, Uxbridge. Plans have been made for a 3-story addition, 54 by 64 ft., for the Uxbridge Worsted Co.

*Michigan, Romeo. In connection with enlargements at the plant of the W. Rumsey Co., formerly the Rumsey Wool Stock Co., the main office will be moved from Detroit to Romeo, and after August 1 all buying and selling will be done here. The new 2-story brick building, 40 by 100 ft., now under construction, will be used for office and warehouse purposes and for the sorting of clips and wool rags. This concern manufactures wool shoddies and cotton waste, operating 5 sets of cards and giving employment to 35 hands. The capital stock is $50,000. W. Rumsey is president; B. Baisch, treasurer and H. D. Rumsey, superintendent.

New Jersey, Camden. The Salisbury Worsted Mills, formerly Clark & Jones, spinners of worsted yarns for weaving and knitting on the Bradford system, have increased their spindleage to 2,080 and changed their plant over to electric drive. They also report that they have under construction a new two-story and basement brick building, 155 by 42 ft., which they expect to be ready for occupancy by August next. The new plant, which will be operated in conjunction with the one they are now running, is located at 6th and Byron Sts. and will be equipped with spinning and twisting machinery sufficient to double their present equipment.

New York, Amsterdam. Two additions will be built to the plant of Shuttleworth Bros. Co., manufacturers of carpets and rugs. One will be 2 stories high, 50 by 40 ft., and will be used for office purposes and the other will be built on the shipping building and will be 30 by 150 ft.

New York, Yonkers. The Alexander Smith & Sons Carpet Co. will build a new 4-story mill, 190 by 74 ft. It is said that contracts for the construction work are now being awarded.

Ohio, Hamilton. Four broad looms are to be installed in the Miami Woolen Mills, also a new gas engine for power to replace the present steam power equipment.

Pennsylvania, Philadelphia. The new 4-story building erected as an addition to the other two buildings occupied by the Andrews Mill Co. at Leiper and Adams Sts., Frankford, has been completed. The company in addition to removing its offices to the top floor of the new building is now equipping the other three floors. They are operating at present 220 broad looms on woolen and worsted dress goods, which they dye and finish and sell through their offices in New York.

Pennsylvania, Philadelphia. The Coquanock Mills at 70th St. and Haverford Ave., of which J. Morton Brown is now the proprietor and superintendent, have increased their spinning equipment to 7 sets and 400 mule spindles and are now operating 88 looms on woolen men's wear and skirtings, which they dye and finish and sell through New York.

KNIT.

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New Mills.

Canada, Ontario, Brampton. A new knitting company has been established here under the name of Best-Knit, Ltd., and is making sweaters, scarfs and similar goods. John McMurchy, proprietor of the Huttonville (Ont.) Woolen Mills is president; M. G. Chantler, secretary, and Leo J. Layten, manager.

*Pennsylvania, Erie. Underwear manufactured by the Mentor Knitting Mills Co. will be cut and finished at the new branch plant in Erie. The equipment consists of 64 sewing machines operated by electric power. L. A. Uttrich is the superintendent. The buying is done by W. C. Spalding, the president, at Mentor, O.

Pennsylvania, Philadelphia. Max and Joseph Erstling and Louis Rothschild, all of New York, have leased the quarters at the corner of Lehigh Ave. and Mascher St., formerly occupied by the Marion Hosiery Mills, which they will equip to produce ladies fine union suits. Machinery is now being installed. Messrs. Erstling compose the firm of Erstling Bros., 51 Leonard St., New York, knit goods selling agents. Arthur Townsend has been engaged to take charge of the knitting. They have space for 50 knitting machines, but this number will not be installed at first.

Pennsylvania, Philadelphia. Louis Bry & Co. have leased a portion of the Florence Mills at Lehigh Ave. and Mascher St. in which they will install a number of foreign knitting machines for making a line of knit underwear under the name of "Boucle." The machinery for the equipment of the plant is now on the way to this country.

*Wisconsin, Merrill. A charter has been granted the Merrill Spinning Co. with capital stock of $15,000. The plant formerly operated by C. Hendrich at Cleveland, O., has been moved here and the machinery is being placed in a building on Second St. Carl Hendrich and W. F. Peterman are the men who control the company.

Wisconsin, Superior. A new concern is being organized under the style of the Superior Knitting Mills with capital stock of $25,000 in which J. H. Sorensen of the St. Paul Knitting Works of St. Paul, Minn., is largely interested. A meeting is to be held in a few days at which the directors and officers will be chosen. It is understood that the St. Paul Knitting Works of St. Paul, Minn., will be discontinued and the machinery moved to Superior and that some of the equipment of Nelson Bros. Knitting Works of Minneapolis also will be shipped to the new plant.

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Enlargements and Improvements.

Canada, Ontario, Toronto. A. T. Reid & Co., manufacturers of neckwear, have installed knitting machines for making knitted ties and scarfs.

*Connecticut, Bridgeport. The addition under construction for the W. S. Mills Co. is for a general enlargement, giving more room.

*Georgia, Rossville. It will probably be 90 days before the change from steam to electric power is made in the Richmond Hosiery Mills. Bids are now being received by their engineers, Messrs. Lockwood, Greene & Co.

Illinois, Chicago. The Western Knitting Mills, David H. Gorchakoff, proprietor, have removed to larger quarters at 1121 South Halsted Sts. This concern was formerly located at 1401 South Jefferson St., where they manufactured men's, women's, misses' and children's sweater coats, golf vests, cardigans, full fashioned half hose and fancy knit goods.

*Indiana, Fort Wayne. Another shipment of German knitting machinery has arrived at the Wayne Knitting Mills and will be installed in the new 4-story addition, recently completed. The Roanoke branch of this concern is starting up more machinery.

Maryland, Baltimore. Contract has been awarded by the Mt. Vernon Knitting Co. for five new knitting machines and one looper. This will double the capacity of the mill. Men's half hose is the product.

Maryland, Hagerstown. A number of electric motors ranging from 3 to 10 h. p. are being installed by J. C. Roulette & Sons, proprietors of the R. A. Knitting Mills. Power will be furnished by the Municipal Light Co.

New Hampshire, Lakeport. One set of cards will be added by H. H. Wood & Co., not two sets as stated in other reports. No other changes will be made.

New Jersey, Camden. The Camden Knit Goods Company, now located at West and Senate Sts., report that insufficient room in their present quarters will necessitate their removal to another building, arrangements for which are now being made. They are manufacturing ribbed and flat underwear on 40 knitters, and sweater coats on 11 flat knitting machines, selling the production direct.

*North Carolina, Chapel Hill. Besides building an addition 130 ft. in length to the local plant, the Durham Hosiery Mills will install a new engine. Contracts for the building have been awarded and call for its completion in 90 days.

*North Carolina, Kernersville. The new plant of the American Hosiery Mills, Inc., to replace the one recently destroyed by fire will be equipped with 400 knitting machines for making men's, women's and misses' hosiery. This is approximately the equipment of the old plant. There will also be constructed a dye house and steam power plant. O. W. Kerner is president; John G. Kerner, treasurer and Geo. O. Johnston, superintendent. Frank F. Kerner attends to the buying.

*North Carolina, Winston-Salem. The installation of 1,500 spindles with preparatory equipment in the plant of the P. H. Hanes Knitting Co. is practically completed, giving them a total of 10,000 spindles.

Pennsylvania, Bangor. The capital stock of the Bangor Silk Knitting Co. has been increased from $5,000 to $20,000. The company has acquired property on S. Murray St. and will build an addition to

be used as an engine room, boiler house and dyeing department. At present silk hosiery is manufactured on 11 knitting machines and it is understood additional machinery is to be installed for manufacturing hosiery and underwear. Henry Berendsen is manager and buyer.

Pennsylvania, Easton. There have been reports that the Easton Knitting Mills Co. is interested in the establishment of a plant at Quakertown, Pa. The company advises that this does not mean that they contemplate any removal of their present plant, but expect to make some enlargement in it shortly. Seamless hosiery is the product.

Pennsylvania, Emlenton. Four hosiery knitting machines are being installed in the Richland Woolen Mills, A. E. & J. O. Conn, proprietors, and will be in operation by June 1 on woolen half hose. The company heretofore has made only wool knitting yarns on 1 set of cards and 320 looms.

New York, Amsterdam. The Chalmers Knitting Co. has bought a lot of land on the South side of the river on Bridge St., 300 by 360 feet, upon which a modern 4-story mill building will be erected. Mesh underwear is manufactured and has been extensively advertised. The capital stock is $400,000. D. W. Chalmers is president and buyer; John Barnes, vice-president, and John R. Blood, treasurer.

New York, Brooklyn. The Alliance Knitting Mill has removed from 365 Harman St. to larger quarters at 96 Stockholm St.

New York, Catskill. It is reported the Union Mills will build a 4-story addition, 60 by 150 ft., to one of their mills here.

Pennsylvania, Mt. Carmel. Wm. E. Taubel, Inc., large hosiery manufacturers of Riverside, N. J., who operate a branch plant here, are having plans prepared for a 2-story mill to be built in Mt. Carmel. Mr. Taubel was here a few days ago looking over prospective sites.

Pennsylvania, Philadelphia. Miller & Sons Co., operating the Knotair Hosiery Mills at 53rd and Westminster Ave., on men's and women's fine lisle, mercerized and fancy silk hosiery, with 250 knitters, have recently purchased two plots of ground, on the opposite side of the street, measuring 50 by 160 ft. and 67 by 130 ft., on which they will erect a new mill to be used in conjunction with the one now occupied by them. Architects are now working on plans calling for a dye and finishing plant and a building in which they will install knitting machinery, giving them an increased producton of 50 per cent. The offices will also be removed to the new building and additional machinery installed in the old plant which will be used for knitting purposes only. They expect to start on the new operation some time during the coming Summer.

Pennsylvania, Reading. Plans have been drawn for a new mill building for the Reading Glove & Mitten Mfg. Co. on which construction work will be started at once. It is expected the enlargement will be completed in September. The present equipment will be moved into the new building before any additional equipment is ordered.

Pennsylvania, Philadelphia. The equipment of the Penn Worsted Mills, operated by Yewdall & Jones at 54th and Poplar Sts., has been increased to 5 combs and 4,500 spindles, on which they are manufacturing worsted yarns.

Rhode Island, Mapleville. Contract has been awarded by the Coronet Worsted Co. to A. C. J. Learned & Co. for the erection of an addition to the finishing building to be 1 story high, 31 by 176 ft.

Tennessee Springfield. The Springfield Woolen Mills Co. has awarded contract for 4 broad looms, a burr picker, mixing picker, a 60 inch set of cards and 3 mules. In the near future an order will be placed for two double acting nappers. All wool blankets are manufactured. H. Tatham is superintendent and buyer and would like information on filters as the company has in view the installation of filtering apparatus.

*Wisconsin, Burlington. The Burlington Blanket Co. has called for bids for a new concrete building, 60 by 140 ft., to replace the storehouse recently destroyed by fire.

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Mills Starting Up.

Massachusetts, North Bellingham. The Taft Woolen Co. of Caryville has leased No. 1 Mill of the Charles River Woolen Co. and is operating it on their lines of unions, cassimeres and satinets. A. E. Bullard, treasurer of the Taft Woolen Co. is also treasurer of the Charles River Woolen Co., which a short time ago decided to liquidate.

SILK.

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New Mills.

New Jersey, Passaic. A. P. Villa & Bros., raw silk importers of New York, have purchased the mill buildings on Central Ave. above the Harrison St. Depot, formerly occupied by the Passaic Metal Ware Co. and will equip a plant for throwing, warping, quilling and winding. They intend to have one of the best equipped plants of the kind in the country. The property consists of a large main brick, 2-story structure and a smaller 2-story and basement mill with power plant. The buildings are well constructed for this class of work and are equipped with sprinkler service throughout. A. P. Villa & Bros. are located at 487 Broadway, New York City.

New Jersey, Paterson. A new concern known as the New Fashion Silk Co. is located at 200 Straight St. Ten looms are operated on broad silks.

New Jersey, Paterson. H. Rosenberger has bought the plant of the Bright Silk Co., 93 River St., consisting of 6 broad silk looms. Ten looms have been secured elsewhere and with the Bright Co.'s plant are being moved by Mr. Rosenberger to the Hamilton Mill on Mill St. No further increase is possible, owing to the limited space.

New Jersey, West Hoboken. A new concern known as Frank & Brackenfeld is operating 8 jacquard looms at 717 Syms St. on fancy broad silks.

*Pennsylvania, Northampton. The equipment of the new silk mill of D. G. Dery will consist of 300 looms for manufacturing broad silks. Unfavorable weather has delayed the completion of the mill.

Pennsylvania, Ridgway. The promoters of the proposed new silk mill are going ahead with the project and are reported to have purchased some machinery equipment. G. W. Sykes, president of the Sykes Woolen Mill Co., Reynoldsville, heads the project and Otto Hauber, also of Reynoldsville, is interested and will have charge of manufacturing. It has been reported that a 1-story brick mill will be erected.

Pennsylvania, Williamsport. Twenty silk looms from the plant of the Demarest Silk Co. of Paterson have arrived for installation in the old Kennore shoe factory building, recently purchased by the Demarest Co.

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Enlargements and Improvements.

Connecticut, New London. Brainerd & Armstrong Co. are considering making an addition. They are very busy in their broad silk weaving department.

Connecticut, Watertown. The Heminway & Bartlett Silk Co. have added hosiery machines and are making a line of silk goods. Excavating for the 3-story mill which will be 40 by 80 ft. has been begun. As noted previously, all departments are to be increased.

*New Jersey, Paterson. Repairs will be made at once in the plant of the Hamilton Silk Co. which was recently damaged to the extent of $6,000 by fire.

*Pennsylvania, Scranton. The proposed increase in the capital stock of the Scranton Textile Co. to be voted on July 9 will be used in part to purchase new machinery for manufacturing flat and ribbed goods and to provide additional working capital. The proposition is to increase from $400,000 to $500,000 by issuing 7 per cent. cumulative preferred stock.

Pennsylvania, Scranton. An addition is being built to the plant of the Lackawanna Mills which is to be 130 by 65 ft., to provide more facilities in connection with the dyeing department. It is said the company is working night and day. Men's, women's and children's flat wool and merino underwear is manufactured.

*Pennsylvania, Wernersville. An architect is working on plans for a new mill and dye house for the Wernersville Hosiery Mills and the company expects to award contract and break ground by the first of June. The main building will be 38 by 70 ft., 2 stories and basement, of brick construction, and it is expected to triple the present facilities. The new mill will be modern in every respect and they will have their own lighting system. The concern began manufacturing about four years ago and makes men's cotton half hose, 176-needle goods. The present equipment is 24 latch needle knitting machines, and 16 additional machines will be installed upon the completion of the new mill about August 1. The plant is operated by steam power.

*Wisconsin, Portage. Plans have been made for building a 2-story warehouse, 40 by 100 ft., of brick and concrete construction for the Portage Hosiery Co., to replace the warehouse recently burned.

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Mills Starting Up.

*Washington, Seattle. As suggested in our report of the incorporation of the Saxony Knitting Co., the new concern succeeds the old Saxony Knit Goods Co., which has been through financial difficulties in the recent past. A. K. Matzger, who acted as receiver and operated the plant under the direction of the Court, is president of the new company and attends to the buying. The plant contains 23 knitting machines and 16 sewing machines operated by electric power on sweater coats, bathing suits and hosiery.

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Mills Shutting Down.

Pennsylvania, Philadelphia. On account of the death of one of the members of the firm, John R. Bill & Bro., who equipped a plant for the manufacture of fine seamless hosiery at 1666 Oxford St., Frankford, have concluded to discontinue their operations. The plant is standing idle and will not be started up.

FACTS AND GOSSIP.

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Alabama, Birmingham. A local report states that a cotton mill is to be built in this vicinity by a new $500,000 concern to be controlled by former Governor B. B. Comer. Mr. Comer is president and treasurer of the Avondale Mills of Birmingham, and the Central Mills of Sylacauga.

Canada, Ontario, Iroquois. The Dundas Linen Mills, Ltd., have been incorporated with capital stock of $100,000 by Robt. Caldwell of Bracebridge, Ontario, and others

Canada, Ontario, Frankford. The Frankford Woolen Mill owned by Joseph W. Lee, which was burned out in January, will not be rebuilt. Stocking yarns and tweeds were manufactured on 1 set of cards and 3 looms.

Canada, Quebec, St. Timothee. The project to establish a plant at St. Timothee, to be known as Cotton Prints, Ltd., has been abandoned.

Colorado, Denver. A report states that R. C. Bearrup of Albuquerque, New Mexico, is trying to interest local capitalists in a movement to establish a woolen mill in Denver, and will invest $100,000 in the venture if local capital will come in in sufficient quantities. The plan is to take over the old cotton mill building and convert it into a woolen mill. Probably this is Johney H. Bearrup who was president and treasurer of the old Rio Grande Woolen Mills at Albuquerque, New Mexico, before that plant closed several years ago and who tried about a year ago to interest several Western cities in a woolen mill proposition.

Connecticut, Danielson. At the sale of the property of the Danielson Worsted Co. the real estate was purchased by the E. H. Jacobs Mfg. Co., who state that they bought the mill with the hope of inducing some industry to occupy it. Most of the equipment had been disposed of previously.

New Publications

[Any work noticed under this head can be obtained through the office of this journal.]

Wool Carding and Combing, by Alfred F. Barker, M. Sc., and E. Priestley; 264 pages, 4 1/2 by 7 1/4; Cassell & Co., 43 E. 19th St., New York. Price $1.50.

For many years McLaren's "Woolen and Worsted Spinning" held the chief place in literature of wool carding and combing. Since that book has been out of print there has been great need of a work of the same high standard and brought up to date. It is this want that Messrs. Barker and Priestley have attempted to supply in the volume before us. The subject is treated under the following heads: Wool and Hair Producing Animals; Sheep Breeding and Mendelism; Wools, Hairs and the Remanufactured Materials; Commerce in Wools and Hairs; Wool Classing and Sorting; The Physical and Chemical Properties of Wools, Hairs, etc.; Wool Steeping, Scouring and Drying; Types of Yarns Generally Considered; The Preparation of Long Wools, Cross-bred Wools and Merino Wool for Combing; Combing; Recombing and Finishing.

There are many excellent illustrations and great care has been taken to make it a comprehensive text book of the sorting, carding and combing processes.

Bleaching and Dyeing of Vegetable Fibrous Materials; Julius Huebner, M. Sc. Tech. Manchester, F. I. C.; 434 pages, 6 by 9; Constable & Co., London, England.

This work has been issued in order to provide an up-to-date text book on bleaching and dyeing and in a form that would allow of frequent revisions in order to keep it abreast of the rapid developments in these branches of the textile industry. Every dyer is familiar with the difficulty in obtaining the latest information regarding his art, having to rely upon the literature issued by the various dyestuff manufacturers. This work deals with both the chemical and mechanical branches of the subject under the following heads: The Vegetable Fibers; Water; Chemicals and Mordants; Bleaching; Mercerizing; Mineral Colors; The Natural Coloring Matters; The Artificial Dyestuffs; Basic Cotton Dyestuffs; Substantive Cotton Dyestuffs; Sulphur Dyestuffs; The Vat Dyestuffs; Mordant Dyestuffs; Dyeing Machinery; Testing of Dyestuffs and Fibers. It contains ninety-six illustrations, and it is evident that great care has been taken to make it what it professes to be, a thoroughly up-to-date work on bleaching and dyeing vegetable fibers.

BUSINESS LITERATURE

Handy Data on Power Pumping; The Goulds Mfg. Co., Seneca Falls, N. Y.

Bulletin No. 112 contains much useful information regarding the installing and operating of pumps, standard dimensions of wrought iron pipe and light well casing, rules to determine the size and speed of pulleys and gears, weights and measures and other information and data required for figuring out pumping problems.

Engineering Specialties; The Lunkenheimer Co. of Cincinnati, O.

A 1912 catalogue which contains 654 pages, being 100 more pages than that of their previous catalogue. The new book contains descriptions of a large number of new goods and describes what is undoubtedly the largest line of engineering specialties in the world. It also contains much useful information and data of particular value to engineers. Copy will be sent on application to those interested in this line.

Industrial Notes

LOBSITZ MILLS CO., INCORPORATED

The Lobsitz Mills Co. has been organized with a capital of $250,000, all paid in, to take over the business of Samuel Lobsitz, including the mill at Nutley, N. J. Samuel Lobsitz is president of the company and will continue in active management. Henry L. Basch, formerly treasurer of the Passaic (N. J.) Woolen Co., is vice-president, and William F. Pippey, president of the B. Y. Pippey Co., is treasurer. Mr. Lobsitz has been doing business as a manufacturer of and dealer in wool stock, noils, etc., for the past 20 years. The new company will make a specialty of the manufacture of wool stock and garnetted silk stock, also camel's hair, silk and wool noils. The mill has 60 cards, 16 garnett machines, and is operated day and night. The New York selling office of the company is at 260-262 Church St.

THE DANGER OF INCANDESCENT LAMPS

It is a well known fact that combustible materials should be kept carefully away from contact with incandescent lamp bulbs. Neglect of this precaution caused a fire recently in the cloth room of the Granby Cotton Mills, damaging the selvage on about 160 pieces of cloth. The fire was put out by one Grinnell automatic sprinkler head with very slight damage aside from the spoiling of the cloth in process of manufacture.

DAVIS PRESSURE REGULATORS

Large concerns of national prominence use Davis pressure regulators. The manufacturers, G. M. Davis Regulator Co., Chicago, has made recent sales to The National Tube Co., Diamond Match Co., International Harvester Co., National Biscuit Co., Swift & Co., Thos. A. Edison Co., International Paper Co., Pennsylvania Rubber Co., Fred Rueping Leather Co., Bethlehem Steel Co., B. F. Goodrich Co., Pennsylvania Steel Co., Lake Superior Paper Co., and others. The Davis

regulator was the first successful Automatic Reducing Valve made in America. It has had a wide distribution and is used extensively today in all kinds of steam operated plants where it is necessary to use steam at any pressure lower than that which is carried on the boilers.

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SPECIAL BASKETS FOR KNIT GOODS MANUFACTURERS

Cotton and woolen manufacturers have for a number of years been large users of canvas baskets for a great variety of purposes in handling goods in process. The basket manufacturers have developed special types of baskets and basket trucks for all sorts of uses. In recent years W. T. Lane & Brother of Poughkeepsie, N. Y., have been paying special attention to the needs of hosiery and underwear manufacturers, and a considerable number of them are now using the special canvas baskets and basket trucks for a variety of purposes. At the knit goods exhibition in Philadelphia some of these special forms attracted much attention. There are probably a good many hosiery manufacturers who do not realize the labor saving advantages of these special canvas baskets and basket trucks. They are very substantially built, last a long time, and are designed to stand the hardest sort of mill use and abuse.

SIZOLEUM

As a reliable sizing for warps The Arabol Mfg. Co., 100 William St., New York, recommend their "Sizeoleum." It does not call for the addition of tallow. Southern manufacturers, in particular, are greatly pleased with it. It gives unexcelled results on warps for gray goods of the export grade and for converters' goods. Used with Arabol standard sizing starch, it works well as a sizing for warps for sheetings, printcloths, shirting, duck and similar goods.

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A. KLIPSTEIN & CO. IN NEW BUILDING

On May 1st A. Klipstein & Co. moved their New York headquarters and warehouse to 644-654 Greenwich St., corner of Barrow, one block from the Hoboken Ferry. The new location is easily accessible as the following directions for reaching it will show: Take the Hudson Tunnels at any station between 33d St. (at Broadway and Sixth Ave.), and the Pennsylvania, Erie or Lackawanna Terminals, in New Jersey. Get off at Christopher St. Or take the Ninth Ave. elevated road at any station between 42d St. and the Battery; get off at Christopher St. Or take the Subway and change at Astor Pl., or the Third Ave. Elevated R. R. and change at Ninth St. for the Christopher St. trolley going West. The new building is fitted

A. KLIPSTEIN & CO.'S NEW BUILDING.

for their business and affords much better facilities than the former building, which had been outgrown.

ENGINEERS' PRELIMINARIES

The amount of care and expense to be put into preliminary plans is a mooted question among engineers. Chas. T. Main, mill engineer and architect, says in a recent paper:

"There should be intelligence used in the amount of work and expense put into preliminary studies and plans. They must be accurate in substance, but do not require to be worked out in detail at a waste of time and expense. This is a common failing among the younger men that prevents them from obtaining quickly and inexpensively information for preliminary studies which are liable to be discarded, and it is in such work that details are apt to obscure the main result."

STEEL HEDDLES

On recent visit to the Steel Heddle Mfg. Co., 2110-2118 Allegheny Ave., Philadelphia, Pa., our representative found this concern very busy and taxed to their utmost. They manufacture a line of flat steel heddles and frames, and improved drop heddles and wires for weaving all grades of textiles. This company manufacture first-class products and wherever they are used they give excellent satisfaction. Their duplex wire heddle, which is a comparatively new product, has created a great reputation for itself. Many gratifying testimonials have been received from representative mills throughout the country using these heddles. On account of the rapidly increasing business the Steel Heddle Mfg. Co. are now making arrangements for quite an addition to their works to enable them to keep up with the demand. We were greeted most courteously by A. Hellwig, the president and treasurer, and Robert J. Freitag, the enterprising general manager, who escorted us through the factory and explained the workings of the different machines used in the process of manufacture.

PROVIDENCE BRANCH

Owing to their increasing business, the Steel Heddle Mfg. Co., 2110 Allegheny Ave., Philadelphia, have found it necessary to establish an office in Providence, R. I., 76 Dorrance St., where their representative, J. H. Hill, can be reached by mail or telephone. He will be pleased at all times to give inquiries his prompt attention. All correspondence, however, concerning accounts, remittances and mail orders, should be forwarded to the Main Office in Philadelphia.

GRAPHITE AS A SURFACER

No matter how well a piece of machinery is lubricated, unless provision is made for the time when oil or grease fail to do their duty (caused by an obstructed oil channel, overload, leaks, etc.), very serious abrasion is likely to take place and it is then the lubricant which can stand up that protects against losses. Ticonderoga flake graphite, manufactured by the Joseph Dixon Crucible Co., Jersey City, N. J., keeps metal surfaces apart, because of its affinity for such surfaces and its ability to knit up over them a covering, tough, thin and unctuous to the highest degree. In fact, it is this surfacing property which makes flake graphite so valuable as a lubricant. When this graphite surface is produced, the machinery runs more easily with greatly reduced friction.

Prof. Goss says: "The tests show that with no other lubrication than flake graphite the journal and brass may be run together for hours at a time, heating up to a high temperature, and this may be done repeatedly, and yet the rubbing surfaces of the bearings remain unscored. As a protection against abrasion of rubbing surfaces, I know of nothing that can equal the record of flake graphite as herein disclosed."

NEW ENGLAND OFFICE

The New England office of the Champlain Silk Mills has been removed to 531 Industrial Trust Bldg., Providence, R. I. Karl H. Hatch is the manager of this office. The main office of the company is now at Brooklyn, N. Y., and their mills are at Whitehall and Brooklyn.

THE OTIS ELEVATOR COMPANY'S NEW BUILDING

Owing to the largely increased business in New York and vicinity, the Otis Elevator Company have found it necessary to erect their own building for housing the general offices and the supply and service departments for the metropolitan district. This concentration under one roof will greatly facilitate the business of the company and provide for the benefit of users of Otis elevator products the most complete supply and service organization of any elevator company in the

THE NEW BUILDING OF THE OTIS ELEVATOR COMPANY.

world. The building is an imposing structure of modern architecture and construction. It occupies a large portion of the block bounded by Eleventh Ave., Twenty-sixth and Twenty-seventh Sts. and will be occupied entirely by the Otis Elevator Company. In addition to housing the gen-

eral offices of the company there will be kept on hand at all times a full line of parts and supplies ready for immediate delivery. The service organization will include factory-trained experts thoroughly familiar with elevator construction, who, in conjunction with the automobile service for expediting the delivery of needed parts, will be on call at all times, days, nights, Sundays and holidays. This concentration and enlargement of facilities insures the users of Otis elevator products a service organization as perfect as the product itself. The building is nearly ready for occupancy and the company's removal will take place about June 15th.

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GRADUATION EXERCISES

LOWELL TEXTILE SCHOOL

The commencement exercises of the Lowell Textile School were held on June 7th in accordance with the following program:

Address by President Alexander G. Cumnock.
Address by Dr. David Snedden.
Address by Hon. Joseph Walker.
Presentation of the Medal of the National Association of Cotton Manufacturers.
Presentation of the Arlington Mills Prize for Proficiency in Textile Design.
Announcement of the Awards for Proficiency in Chemistry.

Following is a list of the graduates:

Prescott F. Bigelow, wool mfg.....Jamaica Plain
Rollins Brown, chemistry and dyeing.....Salem
Charles B. Coan, chemistry and dyeing, Ward Hill
Richard G. Conant, cotton mfg.....Littleton
Gregory S. Dalton, chemistry and dyeing, Lawrence.
Elmer E. Dearth, chemistry and dyeing....Lowell
Gordon B. Elliot, wool manufacturing....Grafton
Harold B. Frost, wool manufacturing..Somerville
Paul J. Hassett, chemistry and dyeing..Fitchburg
Otis M. Holmes, textile engineering....Haverhill
Leslie N. Hood, chemistry and dyeing, Nashua, N. H.
Robert L. Lamont, wool manufacturing...Malden
Harold W. Leitch, chemistry and dyeing, North Andover.
Sydney P. Munroe, cotton manufacturing, Melrose
Robert S. Niven, textile engineering.....Saugus
James G. Pottinger, wool mfg.....West Roxbury
Raymond V. Roche, chemistry and dyeing, Uxbridge.
Francis J. Shea, wool manufacturing.....Ware
John D. Sullivan, textile engineering....Bradford
Joseph B. Thaxter, Jr., wool mfg.....Hingham
Warren H. Whitehill, chemistry and dyeing, Groton.
Harry Yavner, wool manufacturing....Somerville

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THE BRADFORD-DURFEE TEXTILE SCHOOL

The graduation exercises of the Bradford-Durfee Textile School, Fall River, were held on May 29. Addresses were made by William Evans, James E. Cunneen and Simeon B. Chase. Following is a list of the graduates and the topics discussed:

General cotton manufacturing, three years—George A. Connors, "Weaving"; Joseph F. Flanagan with Fred T. Reynolds, "Designing"; Joseph C. Lanie, "Picking and Carding"; Leon N. McCann, "Double Cloths"; Wilfred A. Morin, "Carding and Drawing"; Fred T. Reynolds with Joseph F. Flanagan, "Designing."

Chemistry and dyeing, two years—C. Nelson Alderman, "Examination of Starches"; Albert S. Almy, "Boiler Water Purification"; Russell C. Winter, "Economics Effected by the Admixture of Coals"; Richard L. Wonson, "Determination of Constants in Mineral Oils."

Engineering, two years—John Barlow, "The Premium Plan of Paying for Labor"; Ray W. Hart; Charles F. McCarthy, "A Smoke Law for Fall River."

Textile designing, Leah O. Millard, "Tinctorial and Pigmentary Colors."

Special weaving, Lawrence F. Murtagh.

The diplomas were distributed by Principal Fenwick Umpleby, who made a very instructive address, from which we take the following extract:

"These two attributes of success go together. It takes courage to act. It is easy to die,—it takes courage to live.

"To go plodding, day after day, on the road to success takes courage,—for the road is never smooth. Yet, if we have courage to keep acting, action will in turn contribute to heart, courage and success.

"You possibly have heard of Sam Edwards, the rustic Scotch cobbler-naturalist. Sam was a cobbler by trade, but a scientist by gift and work. He studied almost every living thing of the earth and sky until he was finally discovered by Smiles, I think it was.

"Then the world learned what Sam himself never suspected,—that a great naturalist had spent his life amid the heather. Queen Victoria sent him a box and medal, but Sam was too old then to derive much benefit from his long-delayed fame.

"To get to the point,—Once Sam was sorely 'down on his luck.' In a fit of despair he approached the seashore, threw down his hat and was about to seek oblivion in the waves when a flock of sanderlings settled just to his left. A peculiar shading and marking on the wing of one of the birds attracted his attention. He immediately forgot all about his intended suicide and began to steal nearer to the birds, but as soon as he gained a vantage point, they rose in flight and settled again at a distance. This they did again and again, with Sam in pursuit, until at the end of 15 minutes he found himself a mile and a half from his hat, 'in good sweat and in good heart'; action had saved his life, and above all his character."

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THE PHILADELPHIA TEXTILE SCHOOL

The Alumni Association of the Philadelphia Textile School held their annual meeting on June 6 and 7. The first session was devoted to the election of officers and the reading of the following papers:

Essential of Good Design, by Prof. Leslie W. Miller.

Child Welfare, by Herbert G. Coe.
Silk Industry of Pennsylvania, by John P. Gordon.
Tussah Silk, by Lawrence A. Stead.
Points on the Finishing of Felted Woolens, by Wm. G. Fraatz.

The second session was occupied with the annual commencement exercises of the school, and the address was made by Hon. William C. Sproul on practical art and the Commonwealth. There was the annual cruise on the Delaware on June 7th which was thoroughly enjoyed by the large number who participated. The exercises closed with the annual banquet in the evening. The speakers were as follows: Mayor Rudolph Blankenburg, Congressman Philip P. Campbell, Abram I. Elkus and Congressman J. Hampton Moore.

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TEXTILE CLUB DINNER

The monthly meeting of the Southern New England Textile Club was held in New Bedford on May 25th, 248 members and guests being present. After the banquet the company was entertained by Daniel L. Crowley's rendition of "That Mysterious Rag," and by Miss Ray, who was the leading entertainer on the occasion. The next meeting will be held at the Commons Club, Providence, when nominations will be made for new officers. Much credit is due the committees for the excellence of the entertainments and the unusually good social times.

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EFFECT OF AUTOMATIC SPRINKLERS

The annual tables of the National Fire Protection Association for 1911-12 show that out of 923 fires under automatic sprinklers during the year, 569 or about 62 per cent., were practically or entirely extinguished by the sprinklers; 307 or more than 33 per cent. of the total were held in check by the sprinklers and kept from spreading, thus giving the fire department opportunity to put them out. This makes a total of 95 per cent. satisfactorily handled. Of the remaining 47 fires in which the sprinklers failed to operate satisfactorily, eight were due to the water having been shut off, thus making the sprinkler system simply a system of empty pipes; seven were caused by defective water supply, without which, of course, the sprinkler equipment is of little avail; 11 cases were due to defective equipment or portions of the building which had not been sprinklered; in one case the system was crippled by freezing; in another the explosion which started the fire wrecked the sprinklers; three were due to faulty building construction involving concealed spaces into which the sprinklers could not throw their water; two showed sprinkler heads plugged, possibly by incendiaries; and five were due to conflagration or exposure fire of such extent as to overtax the defensive equipment. This leaves only nine fires out of more than nine hundred which can be charged to failure on the part of automatic sprinklers, and even in these nine cases the failure was as much a question of putting the sprinklers under a handicap as anything else.

WOOLEN MANUFACTURING IN NEW ZEALAND

From Vice Consul General Henry D. Baker, on special detail

Conditions of prosperity and steady business increase appear to attend the wool-manufacturing industry of New Zealand. Every year shows a larger quantity of New Zealand wool purchased by local mills for the production of rugs, blankets, shawls, clothing tweeds, etc During 1910, 5,642,-113 pounds of wool were bought by local mills, as against 5,202,821 pounds in 1909 and 4,116,722 pounds in 1907. There are 10 woolen mills in New Zealand, the principal ones being those of Petone, near Wellington, Kaiapoi, near Christchurch, and Roslyn and Mosgiel, near Dunedin. The mills near Christchurch are now paying approximately $500,000 a year in wages to employes and $60,000 a year in dividends to stockholders. In 1910 about $50,000 worth of woolen manufactures (chiefly rugs) was exported, as against about $40,000 worth during the previous year.

Improved machinery is being used at local mills and some experts in the English woolen manufacturing industry are being employed in order to raise the standard of goods produced. The greatest difficulty at present is to secure sufficient labor, especially girls for the milling and finishing rooms. Every attention is paid to the comfort of work hands, so as to make them pleased with their conditions of employment. One woolen mill at Wellington has a roof promenade overlooking the harbor for the convenience of the girls during the lunch hour; also special facilities are provided, including hot water, cups, etc., for afternoon tea.

Most of the woolen-mill equipment is imported from England. The duty on such machinery is 5 per cent. from British countries and 15 per cent. from other than British countries. The New Zealand woolen mills have been most successful in the production of rugs of attractive design and excellent quality. A great many of these are sent to London for sale, and they are also always a popular article for tourists to buy as souvenirs. The tweeds and other articles of clothing manufactured have not the reputation or quality of English imported goods, but are well liked for outdoor use or wherever rough wear is expected. The local mills are at present busy manufacturing the clothing required for the new compulsory system of military defense.

In Australia the Australian defense department is proceeding with proposals for the establishment of a woolen mill to make clothing for the military forces. The acting Minister of Defense of Australia has announced that a Scottish tweed expert has been appointed manager of this factory, which is to be located at Canberra, the site of the new Federal capital.

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A NOTEWORTHY ROOFING FIRE TEST

A crowd of about six hundred in Houston, Tex., witnessed a novel and very effective fire test of a ready roofing a short time ago. A miniature house was built about 7 feet high by 6 feet wide, covered on all sides with J-M Asbestos Roofing, as shown in Fig. 1. The lower part of the building was embedded three inches in the ground, and around three sides fire wood was placed, as shown. The fourth, or open side of the structure,

was left clear. There was a strong wind blowing, and when the kindling was ignited, and the fire well under way, as shown in Fig. 2, the fire made such an intense heat, that the large crowd surrounding the house had to retreat from the sides and rear to a distance of at least ten feet.

During the test, while the flames were going all over the building, the spectators were invited to step inside the house and see how cool it was. It was found to be cool and comfortable with the exception of a little smoke which the wind drove within. After the fire had been burning for about

FIG. 1 — TEST HOUSE COVERED WITH J-M ASBESTOS ROOFING MADE BY THE H. W. JOHNS-MANVILLE CO.

15 minutes, it was extinguished. The roofing was not injured in the least, being only blackened by smoke. Then the ashes were removed, the roofing torn off where most blackened, and, as shown in Fig. 3, the boards underneath were as fresh and in as good condition as when they had been put on, with the exception of a few spots where the natural sap of the pine had oozed out. E. R. Parker, the fire marshall, was one of those inside the building during the fire test. The day before, he had unqualifiedly endorsed this roofing for use in the so-called fire district of Houston, an area about two miles in diameter, where a very destructive conflagration recently occurred. The J-M Asbestos Roofing on which this test was made is manufactured by the H. W. Johns-Manville Co., whose home office is in New York. This roofing is made of pure, long-fibered asbestos (stone) felt, securely cemented together with Trinidad Lake asphalt, two practically indestructible minerals.

FIG. 2—THE INTENSE HEAT FROM A WOOD FIRE WAS APPLIED TO THE ASBESTOS COVERED HOUSE FOR FIFTEEN MINUTES.

FIG. 3—AFTER THE FIRE WAS EXTINGUISHED AND THE ROOFING TORN OFF, THE BOARDS UNDERNEATH WERE FOUND TO BE IN AS GOOD CONDITION AS WHEN FIRST PUT ON.

Recent Textile Patents

BOBBIN HOLDER. 1,026,603. Alonzo E. Rhoades, Hopedale, Mass.

DYEBATH and Dyeing. 1,025,273. Myrtil Kahn, Elberfeld, Germany.

DYEING and the Product Thereof. 1,026,574. Gadient Engi, Basel, Switzerland.

FABRIC BORDERING Machine. 1,025,176. Louis N. Williams, Ogontz, Pa.

FABRIC FORMING Device, Tubular. 1,026,648. Eugene D. Bayne and L. A. Subers, Cleveland, O.

FABRICS, Machine for Piling Textile. 1,025,719. Charles J. Priester, Hackensack, N. J.

KNITTING MACHINE Yarn Feed Device. 1,026,176. Albert M. Pigeon, Philadelphia, Pa.

KNITTING MACHINE. 1,025,980. Harry A. Houseman, Philadelphia, Pa.

KNITTING MACHINE. 1,026,206. Emil A. Hirner, Allentown, Pa.

KNITTING MACHINE. 1,027,034. John S. Crane, Laconia, N. H.

KNITTED WEB and Stocking Made Therefrom. 1,025,125. Loretto A. Costello, Philadelphia, Pa.

KNITTING MACHINE. 1,025,182. Wilson W. Burton, Rockford, Ill.

KNITTING MACHINE. 1,025,470. Willis A. Ingalls, Cleveland, O.

KNITTING MACHINE Dial. 1,025,169. Harry Swinglehurst, Philadelphia, Pa.

LOOM, Haircloth. 1,026,430. George S. Cox, Edge Hill, Pa.

LOOPING MACHINE. 1,026,808. Max Koehler, Limbach, Germany.

LOOM STOP Motion. 1,026,342. George W. Chapman, Huntsville, Ala.

SHUTTLE, Hand Threading. 1,025,881. Joseph Poisson, Fall River, Mass.

SILK, Degumming. 1,026,000. Emil Schnurrenberger, Paterson, N. J.

STOCKING. 1,025,328. William Staton, Providence, R. I.

SPINNING and Doubling Frame. 1,025,254. Albert E. Drew, Bolton, Eng.

SPOOLING MACHINES, Spool Cut Out for. 1,025,558. William T. Baldwin, Troy, N. Y.

SPINNING-SPINDLE Attachment. 1,024,942. Thomas Lewis, Scranton, Pa.

SPINNING FRAME Thread Guide. 1,025,365. William O. Bosworth, Northbridge, Mass.

SPINNING MACHINE Stop Motion. 1,018,919. Simon K. Marshall and Minard H. McKinney, Xenia, O.

SPINNING CYLINDERS, Tongs for Separating. 1,020,139. Alfred Furrer, Alstadt, Austria-Hungary.

SHUTTLES, Tension Device for. 1,026,298. Daniel Blanchard, Lowell, Mass.

TEXTILE ROLL. 1,026,226. William M. Rossiter, Sunbury, Pa.

WINDING MACHINE, Yarn. 1,019,173. Alfred K. Miller, Worcester, Mass.

YARN SIZING Machine. 1,020,343. Charles E. Clark, Durham, N. C.

YARNS, Fabric, and the Like, Imparting Luster to. 1,020,117. Ludwig Schreiner, Barmen, Germany.

WARP STOP Motion. 1,026,941. William H. Baker, Bridgeport, Conn.

WINDING MACHINE. 1,027,277. Festus S. Rand, Providence, R. I.

WINDING MACHINES, Tension Mechanism for. 1,027,140. John O. McKean, Westfield, Mass.

YARN CLEARER. 1,026,907. Clarence N. Childs, Lowell, Mass.

RECENT TEXTILE TRADE MARKS

62,079. Sheets, sheetings, etc. Mark: Urica. Owner: Utica Steam & Mohawk Valley Cotton Mills, Utica, N. Y.

62,080. Sheets, sheetings, etc. Mark: Mohawk. Owner: Utica Steam & Mohawk Valley Cotton Mills, Utica, N. Y.

62,083. Cotton piece goods. Mark: Halcyon. Owner: A. G. Hyde & Sons, New York.

62,336. Hosiery. Mark: Gold Bond. Owner: The Wovenright Knitting Co., Cleveland, O.

62,402. Woven carpets and rugs. Mark: Rego. Owner: Hardwick & Magee Co., Philadelphia, Pa.

62,429. Rugs, carpets, etc. Mark: Radium. Owner: W. T. Smith & Son, Cemden, N. J.

60,813. Silk, woolen, worsted, cotton piece goods. Mark: S Co. Owner: G. A. Stafford & Co., New York.

71,701. Hosiery. Mark: Carolina Maid. Owner: Elizabeth City Hosiery Co., Elizabeth City, N. C.

61,787. Cotton, worsted and wool dress goods. Mark: D J A. Owner: David & John Anderson. Ltd., Glasgow, Scotland.

62,141. Hosiery. Mark: Stronghold. Owner: Wm. R. Moore Dry Goods Co., Memphis, Tenn.

58,905. Dresses. Mark: Detgar. Owner: Detroit Garment Mfg. Co., Detroit, Mich.

59,521. Handkerchiefs, veilings, etc. Mark: "Bontell." Owner: Bonwit, Teller & Co., New York.